JULY 1954

FOUNDRY

...WHEREVER METALS ARE CAST

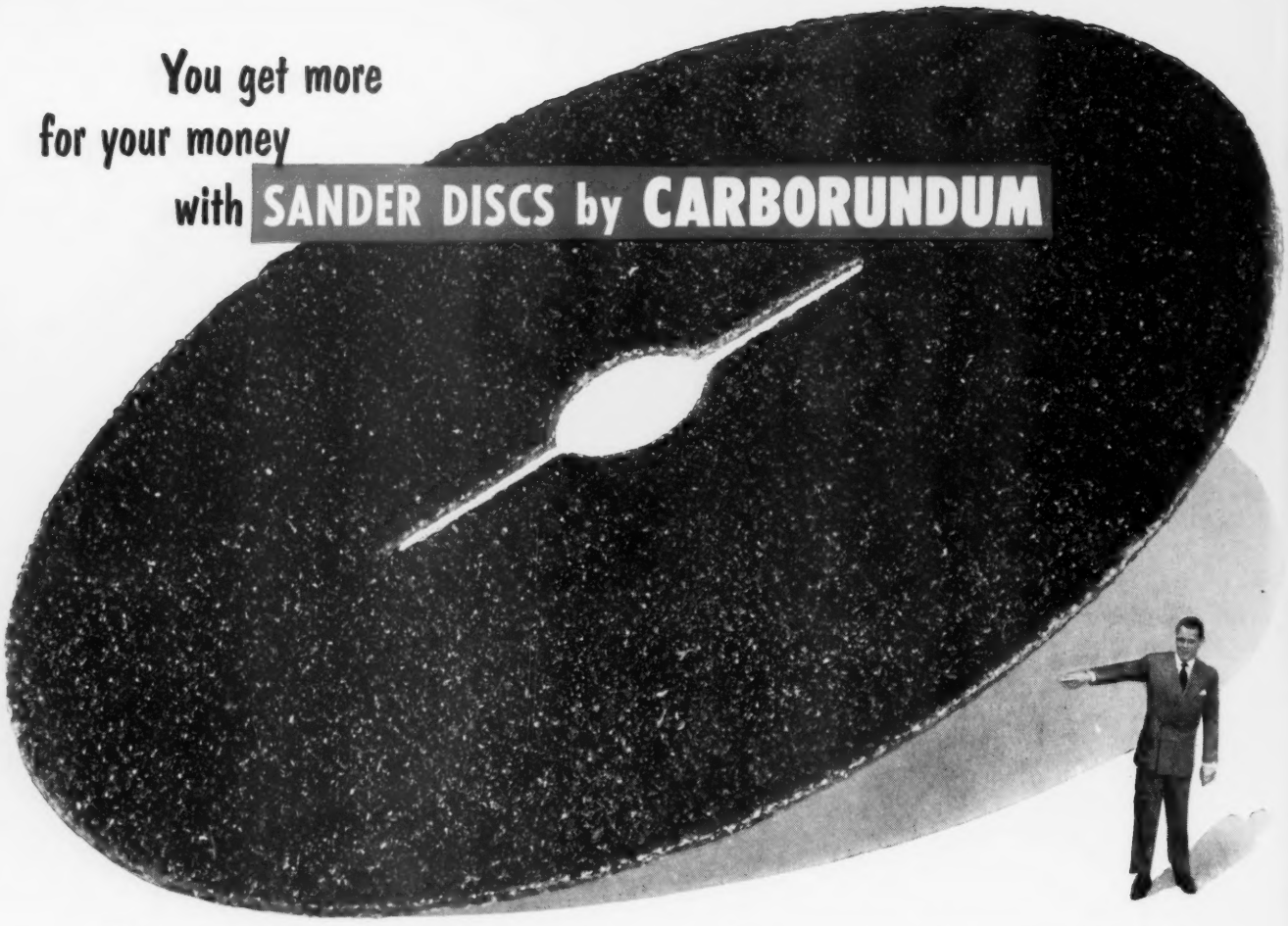
FORGING AND ROLLING GRAY IRON

CASTING 280-mm STEEL SHELLS

HOW TO IMPROVE HUMAN RELATIONS

CONTENTS — PAGE 3

You get more for your money with SANDER DISCS by CARBORUNDUM



You can pay as much—or more—for sander discs and still not get all the advantages offered by CARBORUNDUM's Sander Discs. You can pay less per disc, yet find that handling and storage costs wipe out the savings! Check the discs you are using now against this chart of extras...and draw your own conclusions:

FAST CUTTING ABILITY	Top quality CARBORUNDUM® Silicon Carbide and ALOXITE® Aluminum Oxide grains provide the extra cutting ability in Sander Discs by CARBORUNDUM. These grains are *engineered* for the job...for performance you can count on.
LONG LIFE	Sander Discs by CARBORUNDUM last just a little longer because of their tough fibre combination backings and the special resin bond which holds the grain. A few minutes more per disc soon adds up to impressive savings.
FACTORY FRESHNESS	Moisture content is important in sander discs. Only CARBORUNDUM packages Sander Discs in moisture-resistant boxes...sealed at the factory with the right amount of moisture. Store them properly and they'll never be too dry or too moist.
LOWER STORAGE AND HANDLING COSTS	CARBORUNDUM's modern packaging saves you money in storage and handling. Boxes stack quickly, efficiently...no lop-sided stacks of bales. You can read the labels instantly. Boxes are easier to open—can be used to carry discs to the work area. No piles of loose discs to contend with.
THE RIGHT TOOLS	CARBORUNDUM offers a complete line of Sander Pads to increase efficiency on every grinding or sanding job.

GET ALL THESE ADVANTAGES on your next order by specifying Sander Discs by CARBORUNDUM. For expert counsel, prompt delivery from complete stocks, call your CARBORUNDUM Distributor or Salesman. Or write The Carborundum Company, Dept. F 82-411, Niagara Falls, N. Y.

CARBORUNDUM

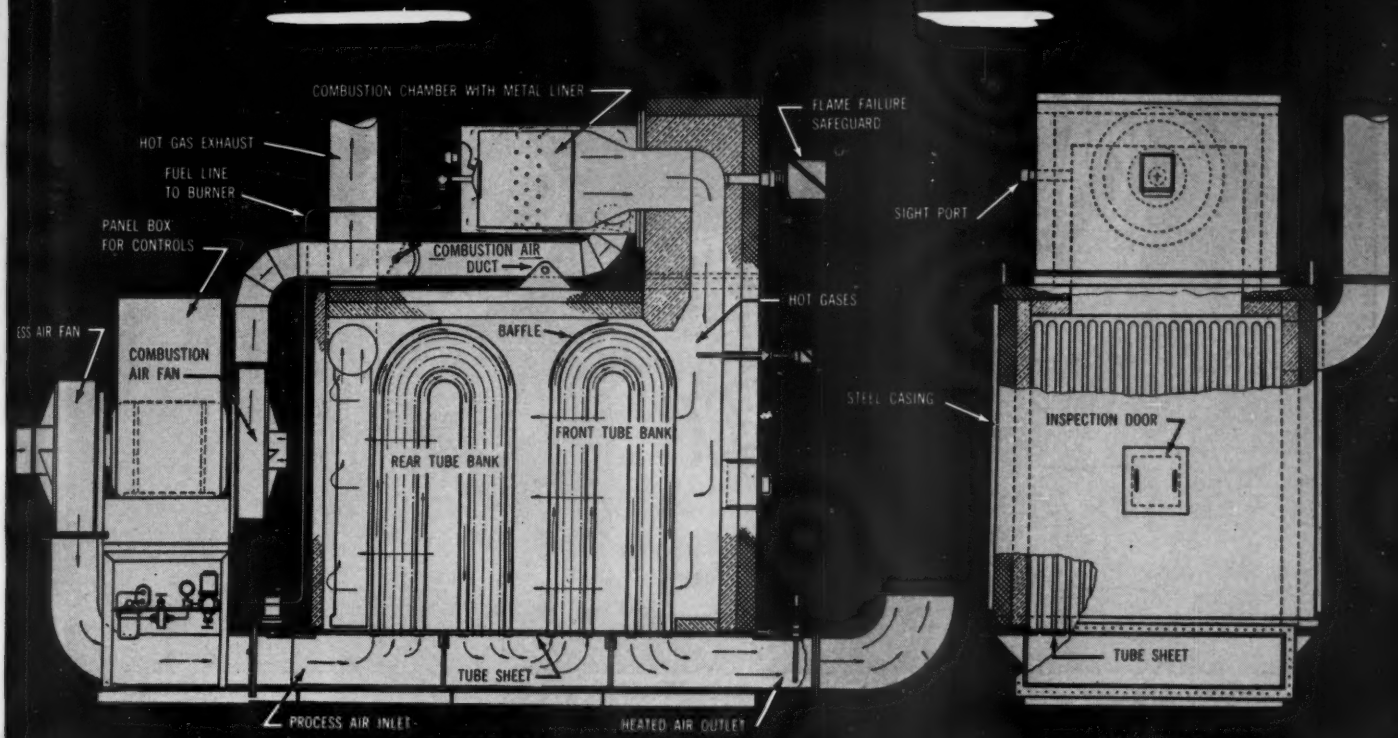
REGISTERED TRADE MARK

...continually putting more SENSE in your abrasive DOLLAR

82-411

WHITING

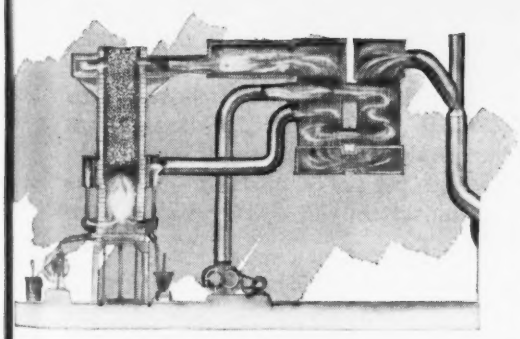
USE HOT BLAST



SIDE SECTIONAL VIEW

END VIEW

Todd-Thermo Process . . . Oil or gas is used to preheat the blast. Particularly useful for short heats, since preheated air is available right from the beginning of the heat.



Griffin Hot Blast System . . . Incompletely burned gas from the stack of the cupola is used to preheat the air.

Pre-heat the cupola air supply and get hotter iron and reduced coke consumption! With a Whiting Hot Blast System you obtain a higher melt temperature which produces hot, fluid metal . . . a higher percentage of good castings with close, even grain . . . closer metallurgical control of the melt and an hourly melting rate increase of as much as 15%. Since proportionately less coke is used the sulphur pickup decreases and the faster melting rate means less oxidation. This permits you to use more *scrap* iron—less *pig* iron!

You have a choice of two Whiting Systems to pre-heat the air. The Todd-Thermo externally fired heater is a compact, high efficiency unit employing a single burner. The Griffin system, a recuperative method, uses partially burned gases from the stack. Each method has certain advantages for particular situations, and a Whiting foundry engineer will help you choose the system that is best for your requirements.

Write today!
Ask for Bulletin FO-3. It gives complete information on the advantages of hot blast.

WHITING CORPORATION
15607 Lathrop Avenue, Harvey, Illinois

THREE'S A CROWD..

. . . but in this case, three sand additives make a perfect slurry!

A well known production foundry recently sought means to improve their molding sand slurry mixtures. After exhaustive tests, using every possible type of sand additive, they found that a combination of three particular additives gives them excellent control of all vital sand characteristics—with much less strain on their pumping system and pipe lines.

As a base for their slurry, this foundry uses #1200 Slurry Grade, Granulated, Federal GREEN BOND Bentonite. This top quality, western bentonite goes into slurry *quickly*. Its medium viscosity in solution, plus its exceptionally high strength, makes possible the addition of exactly the right amount of bentonite to the slurry for maintenance of desired green strength. Up to 2% more Slurry Grade, Granulated GREEN BOND can be added without straining the pumping system.

The addition of Federal SAND STABILIZER and Federal CROWN HILL Seacoal to the bentonite slurry provides the necessary flowability and carbon content—resulting in more uniform mold hardness and better shakeout conditions. Furthermore, the Federal SAND STABILIZER *sharply reduces the viscosity of the slurry*, without decreasing green strength. This makes it possible to *increase* the percentage of Granulated GREEN BOND Bentonite added to the slurry—producing a more highly concentrated strength per gallon of slurry—with *less strain* on the pumping system and *no clogging* of pipe lines.

If you use the slurry system of sand bonding in your foundry, you'll want to learn more about these efficient Federal slurry additives. We'll gladly consult with you about them, or send complete information.

FEDERAL

Make your foundry a better place in which to work!

The **FEDERAL FOUNDRY SUPPLY** *Company*

4600 EAST 71st STREET, CLEVELAND 5, OHIO

CROWN HILL W. VA. • CHICAGO • DETROIT • MILWAUKEE • RICHMOND VA. • ST. LOUIS • CHATTANOOGA • NEW YORK • UPTON, WYO.

IN TWIN CITIES, C. D. Gallaher Company, 428 Stinson Blvd., Minneapolis

FOUNDRY

July 1954

Volume 82—Number 7

Controls Ahead? (Editorial) 77

SPECIAL ARTICLES

Small Foundry Is Rebuilt into Mechanized Operation 78
Current concepts of layout for straight-line production have been incorporated into the rebuilt Auburn Foundry Inc.—By ROBERT H. HERRMANN

Common Sense in Cores 84
Since cores are a problem in economics, great savings can be effected by application of production controls—By WARNER B. BISHOP

Hot Forging and Rolling of Iron Castings 86
Here are the results of tests which show that physical properties of cast Meehanite iron can be increased by hot working—By C. R. AUSTIN

How Management Can Improve Human Relations 90
A successful human relations program at Unitcast Corp. has developed sincere co-operation between management and employees—By JACK C. MISKE

British Foundry Education 92
Educational programs for the training of students in foundry practice and management in England are described—By J. B. McINTYRE

Accuracy Is Essential in Casting 280 mm Artillery Shell 96
Release of hitherto restricted information on production of this alloy steel casting makes available an interesting story—By ROBERT H. HERRMANN

Test Bars for Copper and Aluminum-Base Alloy Castings 100
This coverage of aluminum-base alloy bars concludes the test bar discussion begun last month—By ROBERT A. COLTON and DONALD L. LAVELLE

Seen at the Foundry Show 124

Technical Reports at the AFS Convention 134

Refractories Shop Course .. 134
Heat Transfer 137
Brass Shop Course 138
Safety and Hygiene 140
Steel Castings 143
Core and Molding Sand 147
Gray Iron 152
Gray Iron Shop Course 161
Sand Shop Course 164
Malleable Iron Shop Course . 166
Foundry Costs 168
Plant Equipment 168

Man-to-Man 177
By RALPH L. LEE

Report on the Foundry Industry 183
By WILLIAM G. GUDE

NEWS FEATURES

Around the Country 172
Calendar of Meetings 174
Foundry Group Activities 195
Industry Briefs 170
Late Foundry News 33
Men of Industry 112
News Views 180
Obituary 226

REGULAR DEPARTMENTS

Classified Advertising 267
Data Sheet 231
Foundry Developments 132
How To Do It 189
Ideas for Foundrymen 211
New Equipment and Supplies .. 208
Questions and Answers 106
Statistics 157
Trade Publications 252
With the Editors 10

Business Staff—page 275

Advertisers' Index—page 275

EDITORIAL STAFF

FRANK G. STEINEBACH
Editor

WILLIAM G. GUDE
Managing Editor

EDWIN BREMER
Metallurgical Editor

ROBERT H. HERRMANN
Associate Editor

JACK C. MISKE
Assistant Editor

KENNETH L. MOUNTAIN
Assistant Editor

VIRGINIA C. TAYLOR
Assistant Editor

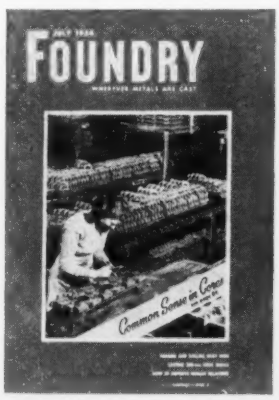
VIRGINIA B. HARMS
Assistant Editor

DON S. CADOT
Art Editor

New York ..... B. K. PRICE
L. E. BROWNE, SAMUEL W. BAKER
Detroit .... FLOYD G. LAWRENCE
Pittsburgh ..... ROBERT M. LOVE
Chicago ..... ERLE F. ROSS
Washington ... E. C. KREUTZBERG
London .... VINCENT DELPORT

ADVISORY STAFF

JOHN W. BOLTON
ALBERT E. GROVER
HARRY A. SCHWARTZ
BERNARD P. MULCAHY



THE COVER: A touch-up job is performed midst a sea of cores at Ferro Machine & Foundry Inc., Cleveland. Photograph supplied by courtesy of Archer-Daniels-Midland Co. See story, page 84

Published monthly by the Penton Publishing Co., Penton Building, Cleveland 13, O. Subscriptions in the United States, possessions and Canada, one year $5; two years $8. Other foreign countries, one year $10. Single copies 75 cents. Copies published three or more months previous to date of current issue $1. Entered as second class matter at the postoffice, Cleveland, O., under the act of Mar. 3, 1879.

Copyright, 1954, by the Penton Publishing Co.

Gigantic casting by Lynchburg Foundry

Moving out of Radford, Va., on its way to Baldwin-Lima-Hamilton Corporation is one of the largest castings in current production at the Radford Plant of the famous Lynchburg Foundry Company.

Weighing 26 tons and measuring 9 ft. x 6½ ft. x 17 ft., this block of cast iron will go into service as an upright for a huge press.

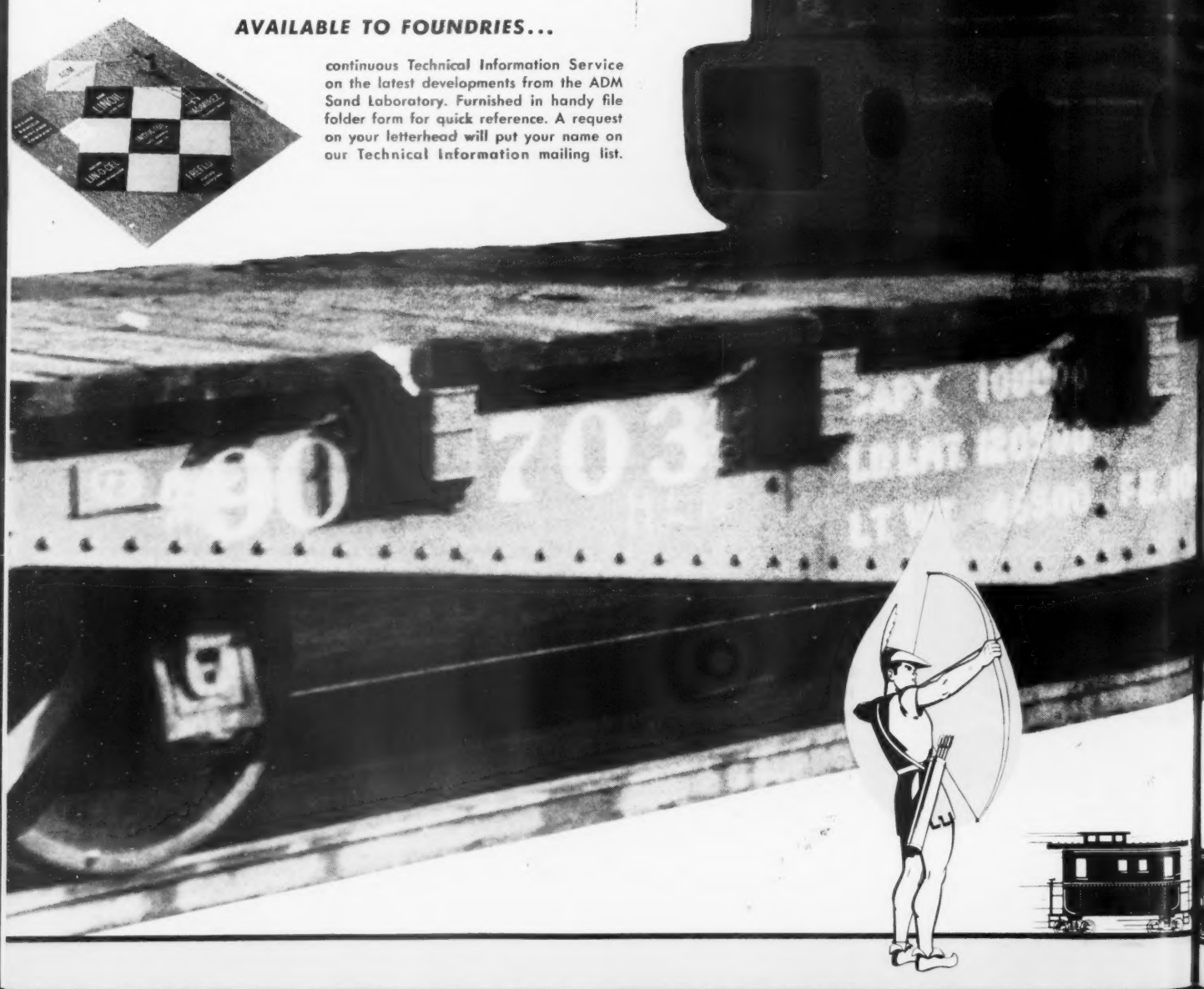
The cores used in producing this casting tip the scales at 35 tons! When you estimate the time, manpower, and materials involved, you can imagine the responsibility placed upon the core department.

Lynchburg Foundry, whose skill is universally recognized, has found that LINOIL is good insurance against faulty cores. Rigid quality control keeps LINOIL uniform, shipment after shipment.

Why not call your ADM Representative today – ask him to ship a trial drum of LINOIL to your plant.

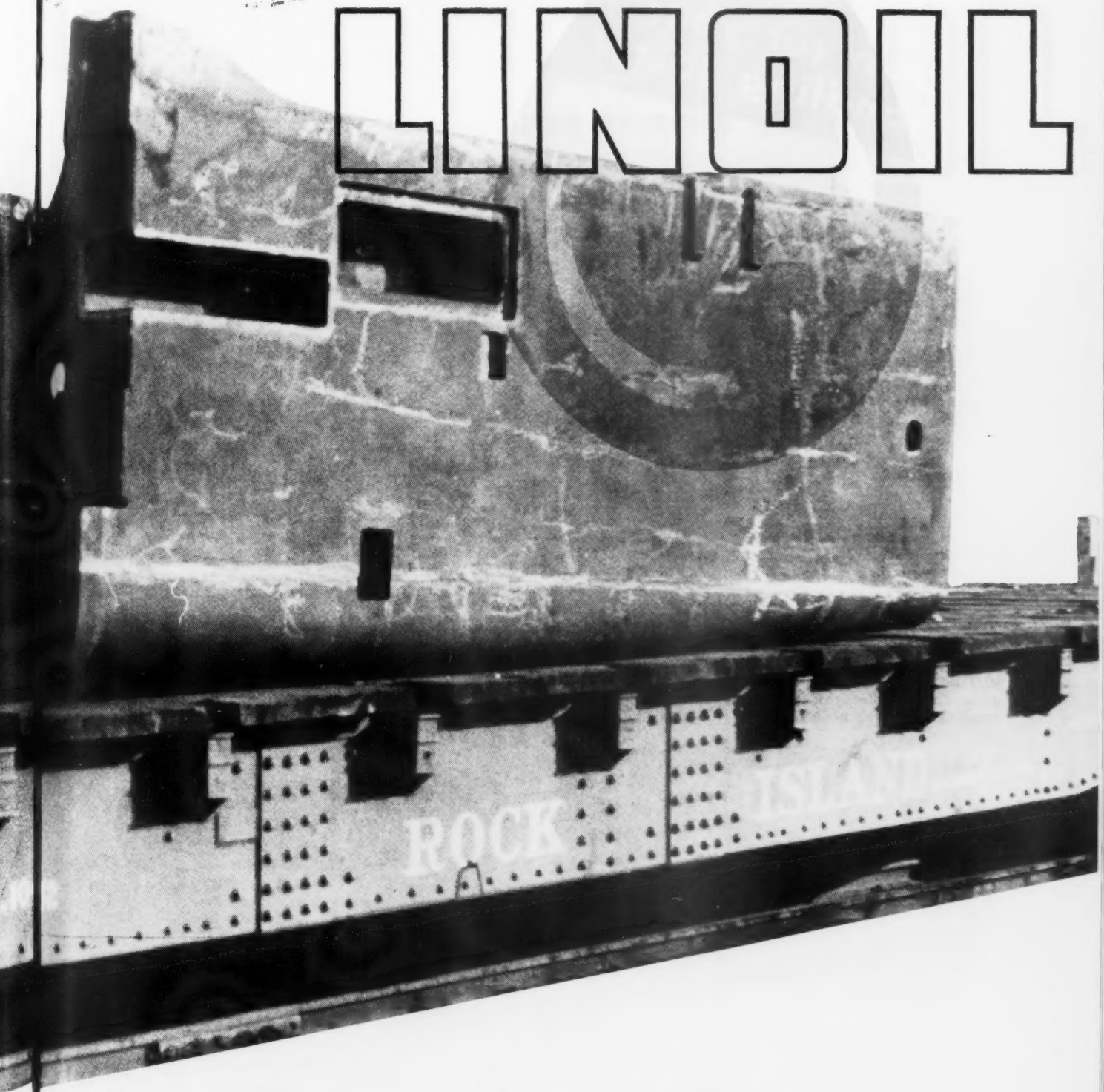
AVAILABLE TO FOUNDRIES...

continuous Technical Information Service on the latest developments from the ADM Sand Laboratory. Furnished in handy file folder form for quick reference. A request on your letterhead will put your name on our Technical Information mailing list.



Co. takes 118 gallons of

LINOIL



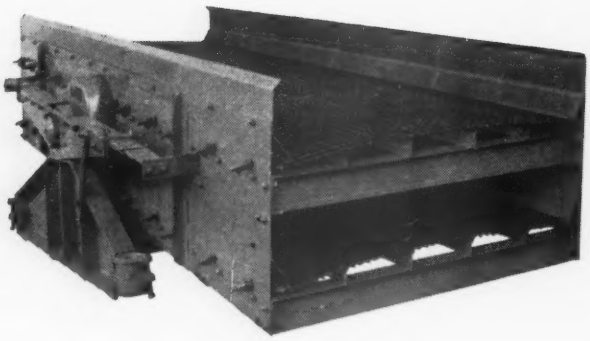
ARCHER • DANIELS • MIDLAND COMPANY

FOUNDRY PRODUCTS DIVISION • 2191 WEST 110TH STREET • CLEVELAND 2, OHI

producers of

HEWITT HR ROBINS can cut your handling costs with this complete

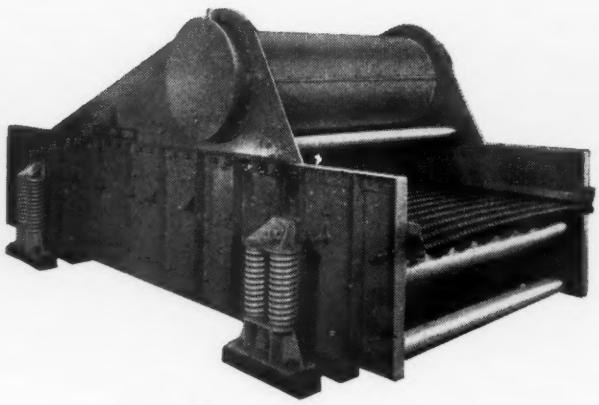
FOR SCREENING



GYREX°

Positive Stroke 4-Bearing Screens

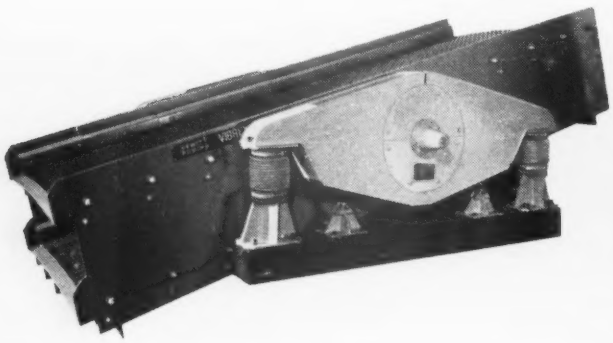
STROKES: ¼" at 1,000 r.p.m. and ½" at 625 r.p.m.
SIZES: Complete range of standard sizes from 48" x 78" to 72" x 192".
DECKS: Single—Double—Triple.
MOUNTINGS: Anvil-type cast iron base with *exclusive angle adjustment* for floor mounting—Steel I-beam base for suspended or rigid mounting.



ELIPTEX°

Horizontal Operating Flat Screens

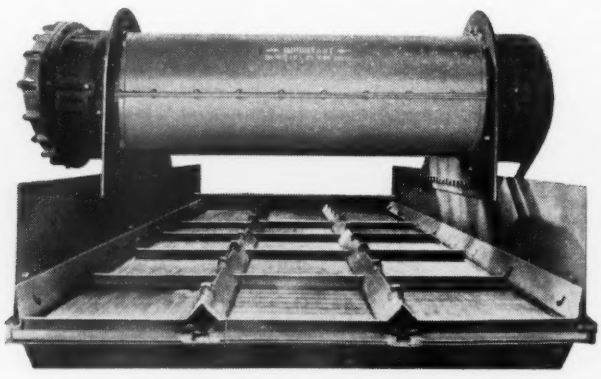
STROKES: 7/16" nominal at 1,000 r.p.m.—Other stroke and speed combinations available to meet special applications.
SIZES: All standard sizes from 36" x 96" to 72" x 240".
DECKS: Single—Double—Triple.
MOUNTINGS: Floor mounted or Suspended arrangement.



VIBREX°

Full-Floating, Unbalanced Pulley-Type 2-Bearing Screens

STROKES: Available in many stroke and speed combinations ranging from ⅛" at 1,800 r.p.m. to ½" at 660 r.p.m. —All Vibrex screens have readily adjustable stroke to meet the most exacting operating conditions.
SIZES: All standard sizes from 16" x 30" to 72" x 192".
DECKS: Single—Double—Triple.
MOUNTINGS: *Exclusive angle adjustment* for floor mounting —Cable arrangement for suspended mounting.



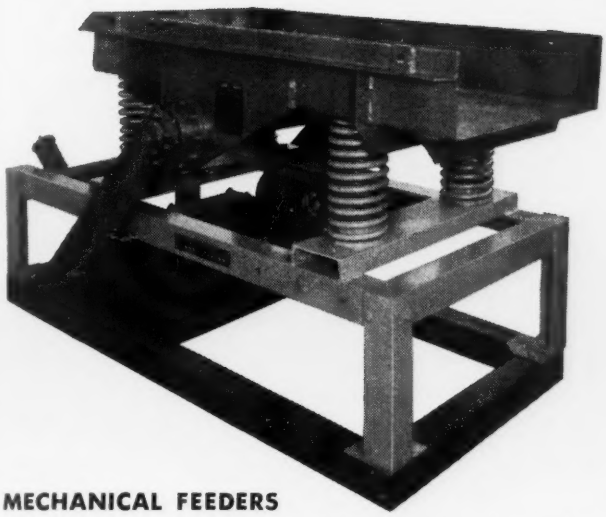
ELIPTEX DEWATERIZER

Specially Designed Eliptex Screen With Micron-Size Opening Stainless Steel Flat Rod Deck

STROKE: Extra-full stroke operating at high speed for maximum efficiency to handle even the most difficult dewatering problems.
SIZES: All standard sizes from 36" x 144" to 72" x 192".
DECKS: Single—Double.
MOUNTINGS: Same as Eliptex Screens.

line of Vibrating Equipment

FOR FEEDING & CONVEYING



MECHANICAL FEEDERS

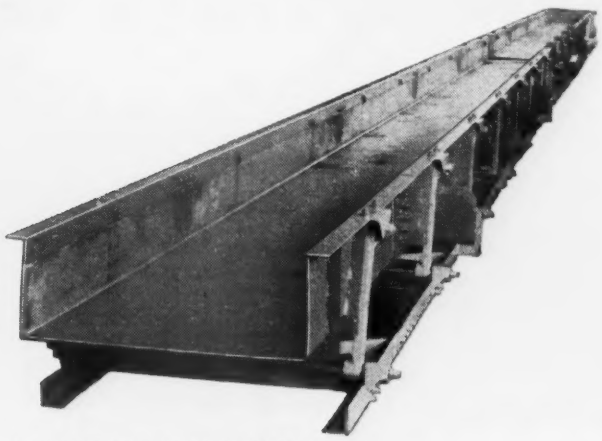
A *fully mechanical* vibrating feeder that is easily maintained by your own personnel. Extremely high capacities at very low power consumption.

FEED CONTROL: Remote, wide range, variable speed controls available.

STROKE: Full 3/16" at 1,000 r.p.m. readily adjustable . . . ideal for handling material of varying characteristics.

SIZES: All standard sizes from 24" x 48" to 48" x 96".

MODELS: Standard—Heavy duty models and special pans and deck designs available . . . suspended or base mountings.



VIBRATING CONVEYORS

A continuously balanced vibrating conveyor offering longer units with higher capacities at lower horsepower than ever before available. Ideal for handling a wide range of materials be it wet or dry, lump or pulverized, packaged or loose, hot or cold, abrasive or corrosive.

SIZES: Standards from 8" to 48" wide up to 150′ long with single drive.

STROKE: Full strokes from 1/4" to 3/8" at speeds of approximately 750 r.p.m.

MODELS: Standard—Heavy duty models and special pan designs and arrangements available.

FOR SHAKING OUT

CAR SHAKEOUTS

Will handle wet, compacted and even partially frozen loads. Capacities vary depending upon characteristics of material . . . Typical unloading time under 5 minutes per car.

MODELS: 5-Ton HD (Heavy-Duty) for handling up to 100 cars per day—3½-Ton GS (General Service) generally recommended for up to 10 cars per day. Both models available with companion twin-hook Car Shakeout Hoist.

STROKE: 5/32" at 1,500 vibrations per minute (easily adjusted for specific applications).

Patent No. 2,504,789

FOUNDRY SHAKEOUTS

Successfully used in steel, iron and non-ferrous foundries of all types (production and jobbing) handling castings weighing from a few ounces up to 60 tons.

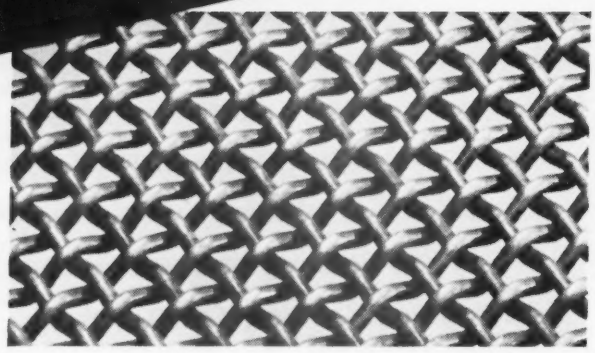
SIZES: From 2′ x 2′ to 8′ x 10′ in single units. Multiple unit arrangements up to 16′ x 33′.

CAPACITIES: Up to 300,000 # (150 tons) in multiple units.

STYLES: Standard Stationary, Portable, Gravity Self-Discharging and Mechanical (Horizontal) Self-Discharging.

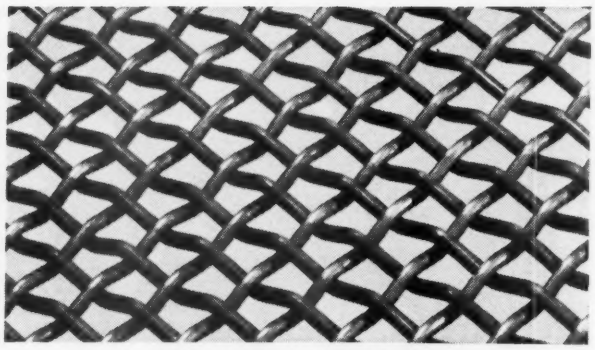
AND FOR YOUR SCREEN CLOTH NEEDS

HEWITT HR ROBINS can cut your handling costs with a complete



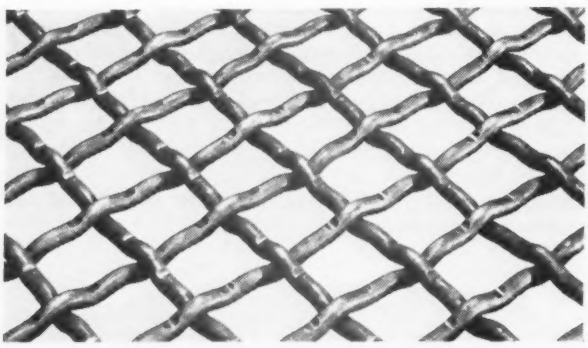
SQUARE OPENING DOUBLE CRIMP

All wires are specially crimped so that a spring tension permanently locks them together at each intersection. This guarantees tightness of weave and accurate sizing because openings cannot vary.



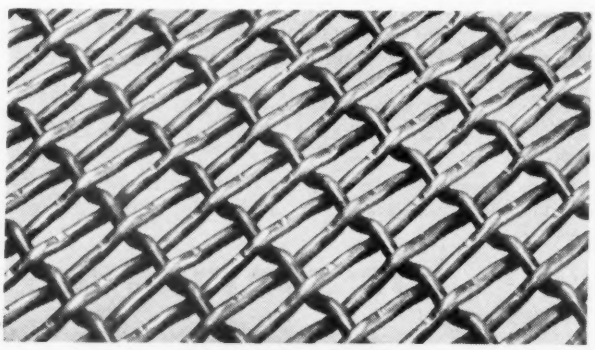
RECTANGULAR OPENING

Recommended for high speed sizing where accuracy is secondary. Rectangular weave provides greater open area hence higher capacity. Furnished with double crimp or flat top weave.



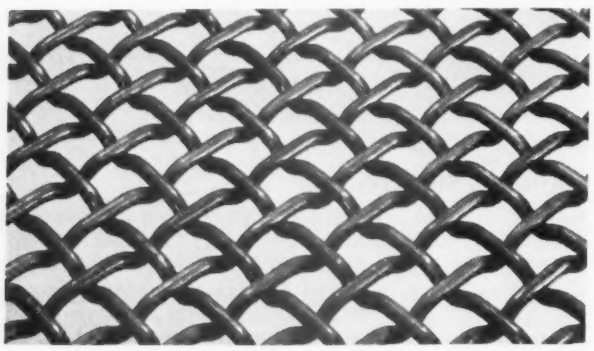
SQUARE OPENING LOCK CRIMP

Ideal for scalping. Has additional crimp to lock wires together under pressure to prevent wires from shifting as a result of impact and handling of oversize materials.



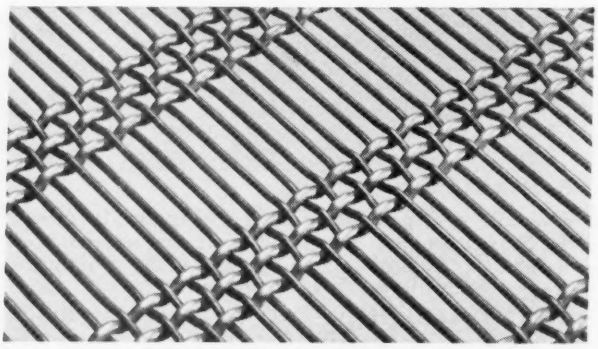
NON-SPREADER

Best for high speed sizing of coarse materials. Heavy-duty wires assist in maintaining accuracy of opening even under impact of wedge-shaped stone and over-sized materials.



FLAT TOP

Crimp characteristics provide smooth screening surface. Absence of high spots, as in other types of crimp, permits free flow and reduces abrasive action of material. Assures longer wear, faster screening and less degradation.



NON-BLIND

Recommended for processing moisture-laden materials that plug or blind openings. Slotted openings kept free from blinding due to secondary vibration set up in longer span wires. Clustered wires carry heavy tension and are crimped to maintain width of opening.

line of Screen Cloth

Each Type of Hewitt-Robins Screen Cloth is Specially Engineered To Accurately Size Large Tonnages . . . Last Longer . . . Cut Your Screening Costs

Hewitt-Robins Screen Cloth guarantees overall sizing accuracy through precision-weaving of individual screen cloth wires. You get longer service because Hewitt-Robins utilizes a full range of metals in its selection of wire to assure that each panel of screen cloth is matched to meet individual job requirements. Types of wire range from genuinely oil-tempered through spring steel, stainless steel, enamel-coated and on to special alloys of extraordinary corrosion and heat resistant properties.

In specific installations where the more abrasive materials such as coke, iron ore, stone, gravel and coal are handled, specify Hewitt-Robins Super-Gyraloy. It's the specially treated oil-tempered wire that combines hardness—stiffness—elasticity—ductility—toughness . . . and must pass exacting laboratory tests for uniformity of these properties.

For operations involving a dust factor aggravated by moisture (as in sizing fine coke and iron ore) specify Hewitt-Robins Super-Gyraloy Enamel Coated Screen Cloth. The enamel coating prevents the build-up of the blinding compound . . . protects the surface against moisture and averts oxidation of the metal.

Where initial cost is of primary consideration and abrasion is not excessive, Hewitt-Robins Gyraloy® spring steel screen cloth provides maximum efficiency and economy. For special applications Hewitt-Robins Screen Cloth comes in plain or galvanized steels, brass, phosphor-bronze, Monel and other ductile alloys.

Hewitt-Robins Screen Cloth is available in standard production size openings from 3/16" and coarser . . . wire sizes from .105" diameter up to and including 1" diameter.

For complete information regarding the kind, type and opening of Hewitt-Robins Screen Cloth to best fit your operation . . . give you highest screening efficiency at lowest cost per ton . . . contact Hewitt-Robins Incorporated, Robins Conveyors Division, 270 Passaic Avenue, Passaic, New Jersey, or your nearest Hewitt-Robins representative.

HEWITT HR ROBINS

Executive Offices, Stamford, Connecticut

DOMESTIC DIVISIONS: Hewitt Rubber • Robins Conveyors • Robins Engineers • Restfoam

FOREIGN SUBSIDIARIES: Hewitt-Robins (Canada) Ltd., Montreal • Hewitt-Robins Internationale, Paris, France • Robins Conveyors (S. A.) Ltd., Johannesburg • **EXPORT DEPARTMENT:** New York City.

"Imperial Belting 3 to 1 better"

says foundry foreman

Less ripping... better heat resistance

Two Imperial Insulated Sahara Belts installed recently at the Duriron Co., Inc., Dayton, Ohio, are giving 3 to 1 better performance than previous belts used, reports S. W. Jamison, General Maintenance Foreman. One of these belts (126′ x 20″ x 6 ply) is shown above on a tunnel shakeout. Ripping damage from sharp iron and gaggers in the hot shakeout sand has been practically eliminated. Heat resistance of the Imperial Belts also is greater, Mr. Jamison notes.

Job-designed for long service

These improved performance qualities result from Imperial's tough construction of heavy-duty silver duck, double-stitched plies, and special impregnation and insulation.

Imperial Belts, job designed for specific operating conditions, can do a better job for you, at less cost. Write today for Data Sheet 54-2.

Imperial
BELTING CO.
1755 S. Kilbourn Ave., Chicago 23, Ill.
You expect more from Imperial ...and you get more

ADD TO YOUR LIST: Many foundries have some type of employee publication which provides an excellent means of communication with workers and their families. Often some of the material included in these house organs is of such a nature that copies are circulated among customers, leaders in the community and other interested individuals. Experience has shown that house organs provide an important phase of personnel, community and public relations.

These publications may take a variety of forms and are distributed at varying intervals. For example, the Hamilton Foundry & Machine Co., Hamilton, O., publishes a weekly news letter. Monthly magazines in the foundry field are represented by such interesting examples as "Foundryways" published by the Belle City Malleable Iron Co., and the Racine Steel Casting Co., Racine, Wis.; and the "Circle-a-tor" published by the Albion Malleable Iron Co., Albion, Mich. Quarterly magazines are represented by the "Iron Worker" of the Lynchburg Foundry Co., Lynchburg, Va., and the "Pelton Test Bar" of the Pelton Steel Casting Co., Milwaukee. There are many others.

A number of these house organs cross my desk and I am privileged to watch with interest the work of developing happy industrial families that help produce an improved product. However, I would like very much to see more of them. Therefore, if you have any type of employee publication, I would appreciate greatly being placed on your mailing list.

—o—

Study the Inventory: If the rush of the convention prevented your studying in some detail the "Inventory of Foundry Equipment" in the May issue, starting on page 146, I would suggest you devote some time looking over the results of this survey. You undoubtedly will be interested to see the progress which has been made during the last ten years in the matter of improving facilities. However, you also will see that a considerable number of machines are probably past the retirement age. How does your plant stack up?

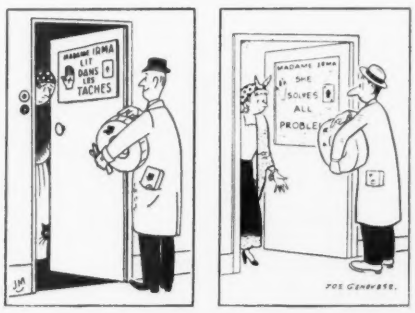
—o—

Is There Complacency?: Speaking of the inventory and the age of equipment, I was particularly intrigued with the following sentence from a recent editorial in our fine contemporary, the *Foundry Trade Journal:* "Thus the foundries which understood mechanization about ten years ago may now have reached the stage when complacency is likely to be encountered, and this must be guarded against."

—o—

Our Face Is Red: I recognize that a certain amount of plagiarism of ideas exists in the field of comic art. But when an idea is copied almost exactly, without credit to the original artist or publication, an apology is due. FOUNDRY takes this opportunity to apologize to the "Journal d'Informations Techniques des Industries de la Fonderie," for an infringement and thanks A. Le Thomas, director general of Centre Technique des Industries de la Fonderie for calling it to our attention.

The illustration on the left shows a cartoon published in the December, 1952 issue of *Journal* and the one on the right a cartoon presented in the July, 1953 issue of FOUNDRY. A more exact copy of the excellent drawing presented in the *Journal* would be difficult to imagine.



The editors of FOUNDRY regret that the cartoonist showed so little imagination, and that we did not recognize the striking similarity before the cartoon was used, or that, using the idea, credit was not given to the *Journal.*

—o—

To Equipment Manufacturers: A recent note from a member of the management team of a live-wire foundry should be of particular interest to equipment manufacturers. It reads:

"Whenever we send, at company expense, one of the members of our organization to a convention, technical meeting, or anything of that sort, we require a report, appraising the benefits to him and to the company that have accrued from his visit. It seems to me that the following quotation from one of the reports turned in on the recent Foundry Show might be worth reporting to your good publication. It runs as follows: 'One thing I did notice was that the majority of the manufacturers exhibiting equipment had made liberal use

(*Concluded on page* 12)

Here's part of the secret of R. H. Osbrink's process

Close tolerance casting in West Coast plant aided by processing cores in Foundromatic dryer

The R. H. Osbrink Manufacturing Company, Los Angeles, has a well-deserved reputation for precision and flawless casting of metals. Castings in which internal cored finishes are 100 or better micro-finish, and castings with a wall thickness of 0.100 inch are routine.

What's the secret of this precision?

Men who have studied the R. H. Osbrink Co. operations say it is a passion for detail . . . and up-to-date equipment.

One example is the modern Allis-Chalmers dielectric sand core dryer. It helps solve two major problems.

1. It provides cores with high dimensional stability — no sag, no slump.

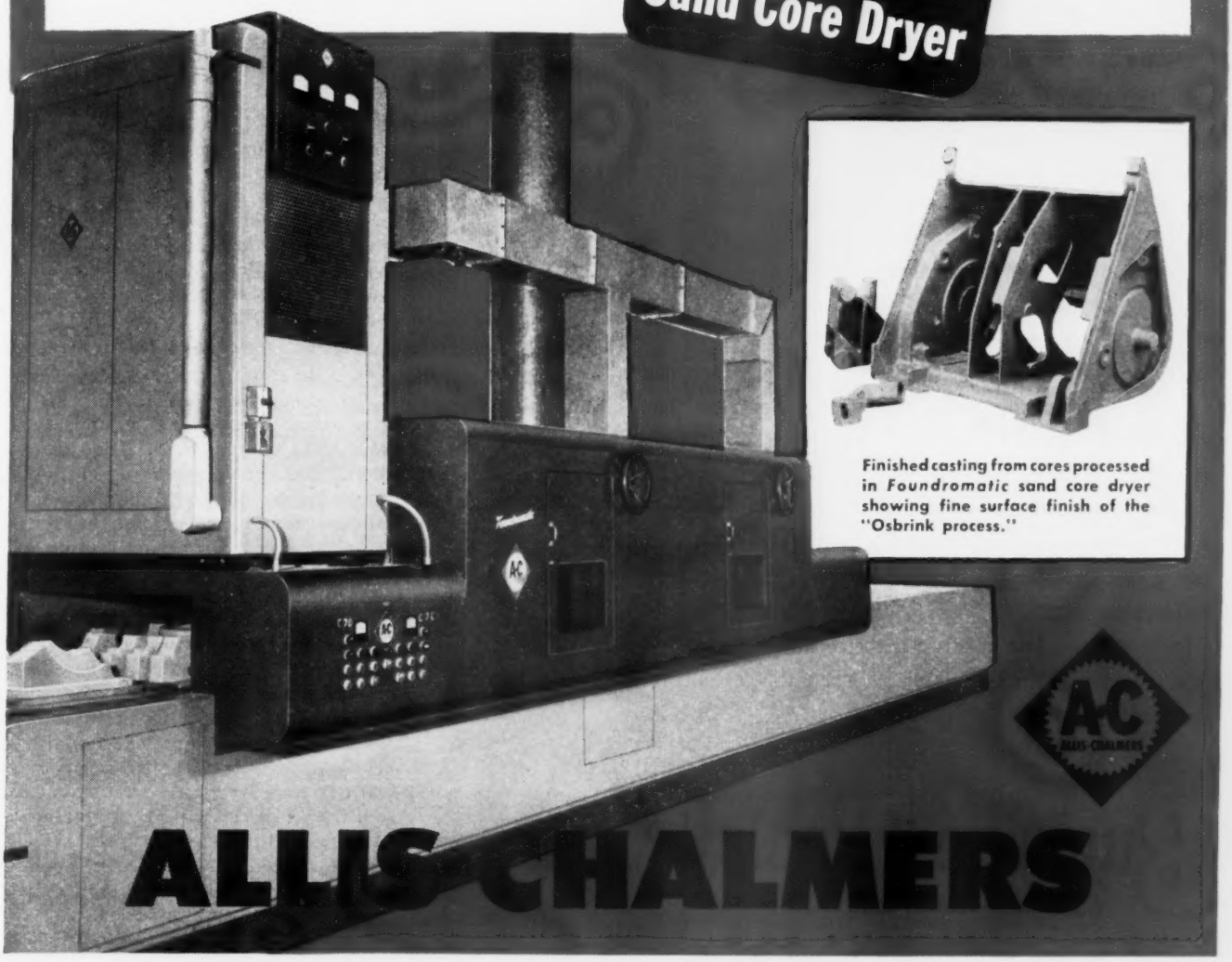
2. It provides cores with smooth surfaces for fine-finish castings.

In addition, the *Foundromatic* dryer cuts core drying time from hours to minutes and reduces handling time.

Get complete information on the *Foundromatic* dryer by calling your nearby Allis-Chalmers office. Or send for Bulletin 15B7306C. Allis-Chalmers, Milwaukee 1, Wisconsin. A-4365

Foundromatic is an Allis-Chalmers trademark.

ALLIS-CHALMERS Dielectric Sand Core Dryer

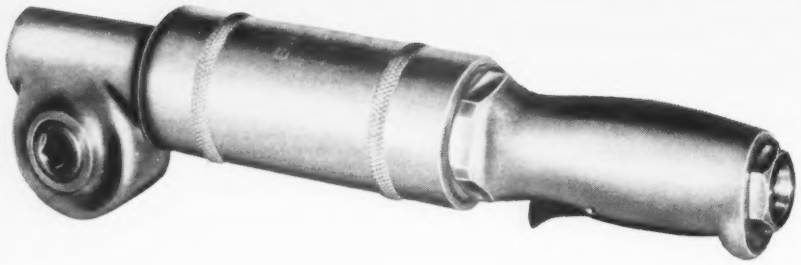


Finished casting from cores processed in *Foundromatic* sand core dryer showing fine surface finish of the "Osbrink process."

ALLIS-CHALMERS

in portable wrenches

YOUR BEST BUY IS BUCKEYE



Nutsetting with a Buckeye portable air-powered wrench is always easier—on the product, the operator and the tool!

Easier on the product—by simply regulating the air pressure, a Buckeye wrench will deliver the desired torque, up to maximum motor capacity. That means fewer rejects due to work spoilage.

Easier on the operator—there's no need to rely on the "feel" of the work to know when the job is done. Should greater torque be needed, the tool can be used, with the air on, as a ratchet wrench.

Easier on the tool—the Buckeye air wrench is the only tool of this type with power provided through planetary **and** worm gearing. The brunt of the work-load is divided over a much greater gear area. That means less tool wear, fewer and lower tool maintenance costs.

You'll find complete details and specifications in our Air Tools Catalog—may we send you a copy? If you like, we'll arrange a trial-test of a Buckeye angle wrench in your own plant, without obligation.

Buckeye Tools CORPORATION
DIVISION 20 • DAYTON 1, OHIO

producers of the world's first successful rotary air tools

(*Concluded from page* 10)

of weldments and fabrications, and minimum use of castings in machines being exhibited.'

"This statement, by the way, followed his description of the various shell molding equipment, and applied particularly to that type of machines.

"While possibly the producers of equipment for this type of work offer the excuse that it is more or less in the experimental stage, it seems to me that it is not too early for foundrymen to demand the use of castings in all types of foundry equipment to the fullest practicable extent."

—o—

They Like Singing: Last month in complimenting the Hermit Singers for their splendid performance at the AFS dinner on May 12, I neglected to mention that the group included two good friends of the foundry industry—Sterling N. Farmer, vice president, Sand Products Corp., and Carl F. Mayer Sr., president of the Carl-Mayer Corp., Cleveland. The latter was tenor soloist for one of the numbers that evening. Carl has made singing his hobby, being a member of at least four singing organizations. He sang with the Ramblers, the quartet that won the state championship of the SPEBSQA in 1946. That quartet sang for the 1946 AFS convention dinner in Cleveland.

—o—

Six Old Foundrymen: If any one of the group of old foundrymen who see FOUNDRY in the Public Library of San Francisco and who recently signed a letter "Six Old Foundrymen of San Francisco" will send his name and address, I would like to send along a note.

—o—

A New Hotel Is Needed: Cleveland received considerable criticism during the recent AFS Foundry Convention and Show because of the hotel situation. Not only were the available rooms inadequate to handle the thousands wishing to attend, but the treatment accorded convention visitors by some hotels provided many gripes. Foundrymen still are complaining. While Cleveland has one of the finest exhibit halls in the country and a favorite of the foundry equipment and supplies industries, it is possible that the lack of sufficient satisfactory housing might cause the society to wait until the housing situation is improved before returning to Cleveland with the Foundry Show. However, there's some prospect of relief; a local business group is sponsoring a study of the subject that may lead to concrete action.

F.G.S.

There'll be even MORE in '54 as

Coking Capacity to — 3,750,000 tons

More Coke for You —

With the addition of 76 new coke ovens at our Ashland, Kentucky, plant, Semet-Solvay Division goes even further out front as the largest merchant producer of by-product coke in the nation—a whopping 3¾ million tons per year! And, because Semet-Solvay has no prior commitments with affiliated steel plants or public utilities, our foundry coke customers have first call on our output.

Only Semet-Solvay Can Offer ALL 4 of These Advantages:

• Nearness of coke plants to your foundry

Only Semet-Solvay has four coke plants to serve you. Strategically located at Ashland, Kentucky; Buffalo, New York; Detroit, Michigan; and Ironton, Ohio; one or more of these plants is within easy reach of 82% of the gray iron foundries in the United States and Canada. Yes, there's a Semet plant in your vicinity to give you fast service and a more dependable supply of foundry coke—when you want it.

• Coke sized for your cupola

You have a choice of five sizes when you specify Semet-Solvay foundry coke. And whichever size you choose, you can be sure of carefully screened, uniformly sized coke that is sturdy and blocky in structure, consistent in analysis, high in carbon.

• Quality-controlled coke for "Better Melting" of your iron

Semet-Solvay is the oldest, as well as the largest, merchant producer of coke in the country . . . our experience spans more than a half century. This extensive "know-how" and our highly integrated and balanced system of coal mines, transport, and coke plants means that Semet-Solvay can control every step in the production of its coke from the mining and cleaning of carefully selected coking coals to the screening and loading of high-quality, properly sized foundry coke. Yes, Semet-Solvay foundry coke is quality-controlled from mine to cupola for "Better Melting."

• Metallurgical service for your foundry problems

When a foundryman wants information or advice it is always in terms of *his* metal, *his* cupola, *his* plant. To give on-the-spot advice and technical help of this kind, Semet-Solvay maintains a staff of trained metallurgists who are practical foundrymen themselves. There is no cost or obligation for this service—just contact our nearest sales office.

SEMET-SOLVAY DIVISION

ALLIED CHEMICAL & DYE CORPORATION

40 Rector Street, Allied Chemical *New York 6, N. Y.*

723 Dixie Terminal Building, Cincinnati 2, Ohio
602 Genesee Building, Buffalo 2, N. Y.
2405 Terminal Tower Building, Cleveland 13, Ohio
2532 Buhl Building, Detroit 26, Michigan

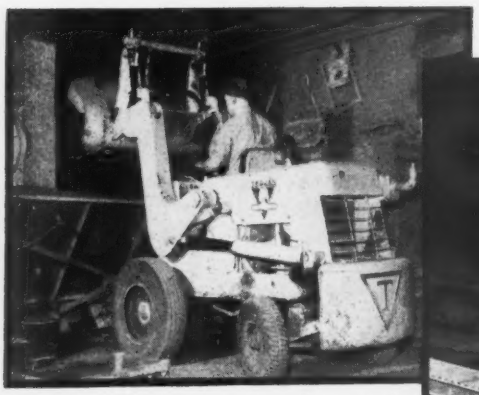
In Canada: SEMET-SOLVAY COMPANY, LTD., 25 King Street, Room 1317, Toronto 1, Ontario, Canada

Trojan Loadsters are . . .

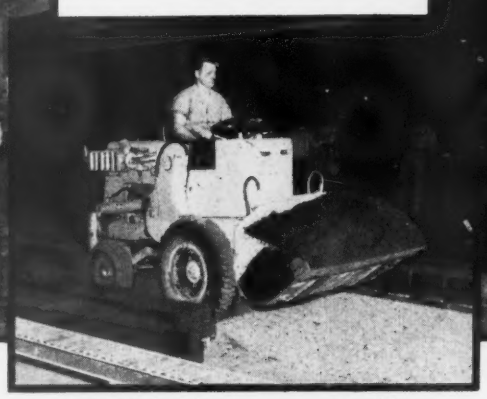
MAN-HOUR SAVERS!

Model LA-40's versatility increases productivity. Whether unloading sand from boxcars, carrying it to mullers or storage, delivering it to molding stations or coremakers, or scooping up from pouring floors, the LA-40 does it FASTER and SAFER.

Trojan's LA-40 handles coke, slag, castings and waste just as quickly and easily, using a minimum of working space (turns in a 6'6" radius).



Model LA-40 dumping processed core and molding sand.



Model LA-40 delivering core and molding sand to molding and pouring section.

Model LA-40 picking up core and molding sand for conditioning.

exclusive BIG 3 features:

1 Reverse curve arms* for safety!

Even when the bucket is fully raised, constant 360° vision and complete safety for your operator is maintained.

(*U.S. Pat. 2,645,369)

2 Low load carrying position!

A low load is a safe load for stability and speed; especially when handling bulk material. Your operator will like Trojan's "wheel level" carrying position.

3 Independent bucket action!

Just flipping the bucket closed, this operator gets a full load everytime. Trojan's independent bucket action pries loose hard packed material, too.

There's one in the Trojan Loadster Line to fit your need —
Model LA-40 — Model LMS-75 — Model LC-100 — Model LC-100-B

CONTRACTORS MACHINERY CO., INC. • BATAVIA, NEW YORK TROJAN

Mail this coupon today for full details on Model LA-40.

NAME _____

TITLE _____ COMPANY _____

ADDRESS _____

CITY _____ STATE _____

pioneering developments keep WHEELABRATOR® *first in blast cleaning*

Replaces 12 Machines—Saves 56 Man-hours Daily

Returns Entire Investment Within One Year At The Fate-Root-Heath Company

Another typical example of the cost-and-time-saving performance of Wheelabrator airless blast cleaning equipment is this gray iron foundry installation at The Fate-Root-Heath Company. One Wheelabrator Tumblast replaced 12 tumbling mills formerly used for cleaning gray iron castings weighing up to 400 lbs. each. 500 pound loads of castings are cleaned in from 3 to 5 minutes, and the castings are so clean they "look as if they had been painted with aluminum paint."

At the same time man-hour requirements were drastically slashed. Whereas it had required 6 men on the day shift and 2 at night to operate the tumbling mills, only one operator is now needed—a saving of 56 man-hours daily. On the basis of these labor savings alone, the Wheelabrator has paid for itself in less than a year's time.

For every casting cleaning problem there is a better solution in Wheelabrator airless blast cleaning. A complete line of standard and special machines is available . . . they will produce the surface cleanliness you desire with the maximum of economy and with the assurance of satisfactory operation.

Why pay a premium for inferior methods of cleaning when an airless Wheelabrator will clean your work faster, more thoroughly, at lower cost?

Bulletin 74-B tells "What the Wheelabrator is and What it Will Do For You." Send for your copy today.

American
WHEELABRATOR & EQUIPMENT CORP.
505 S. Byrkit St., Mishawaka, Ind.

Wheelabrator®
AIRLESS BLAST CLEANING

Manufacturers and Selling Agents: CONTINENTAL EUROPE—George Fischer, Ltd., Schaffhausen, Switzerland; BRITISH COMMONWEALTH—Tilghman's Patent Sand Blast Co. Ltd., Broadheath, England; JAPAN—Tokyo Boeki Kaisha, Tokyo; BRAZIL and ARGENTINA—Equipamentos Industriais EISA Ltda., Sao Paulo, Brazil; AUSTRALIA—McPherson's, Melbourne; MEXICO—Casco, S. De R. L., Mexico, D. F.

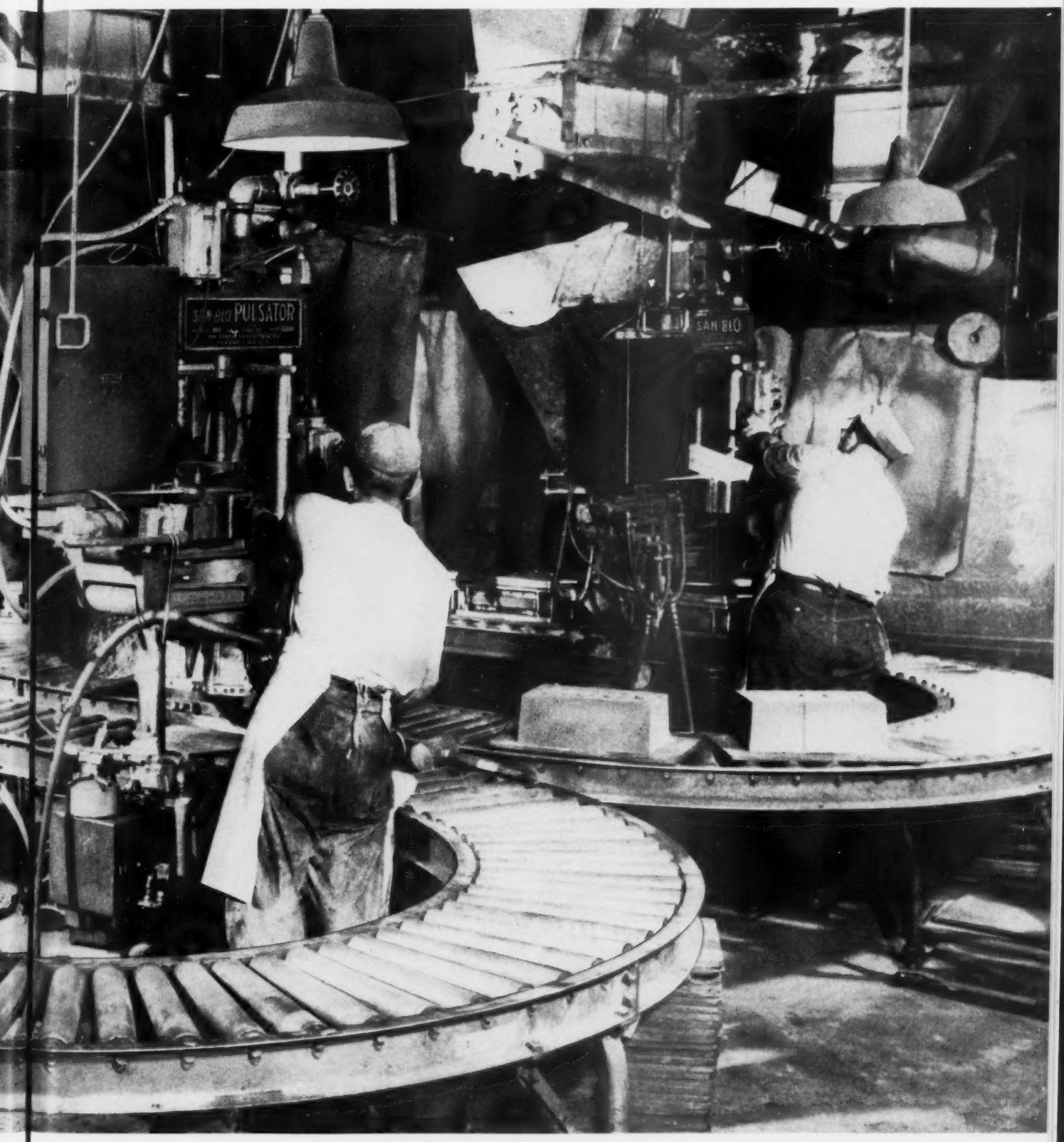
CUT YOUR CORE COSTS, TOO....

Shown below is a section of the core room at Lebanon Steel Foundry, Lebanon, Penna. The two SAN-BLO core blowers produce cores required in the casting of armor ventilating grilles for military tanks. As to the efficiency of these units, we'll just quote Phil Repino, Lebanon's plant engineer . . .

THE FEDERAL FOUNDRY SUPPLY COMPANY

"After due time setting up the one machine, actual performance obtained, on quality and quantity, were impressive enough to immediately create the need of the second unit. The second blower was installed accordingly. In short time thereafter, the desired goal of maximum production, low cost and improved quality of cores was obtained. Considering that we actually had no prior experience in blowing steel sand cores on a production basis, we believe that results and savings were astounding."

Reports from users of SAN-BLO machines indicate that greater production and substantial savings just "come naturally" upon installation of these revolutionary core blowing machines. Why not obtain such economies for your core room, too? Write for full information or call in your FEDERAL representative . . . today!



4600 EAST 71st STREET • CLEVELAND 5, OHIO

CHATTANOOGA • CHICAGO • DETROIT • LOS ANGELES • MILWAUKEE • NEW YORK

THE IDEAL METHOD:

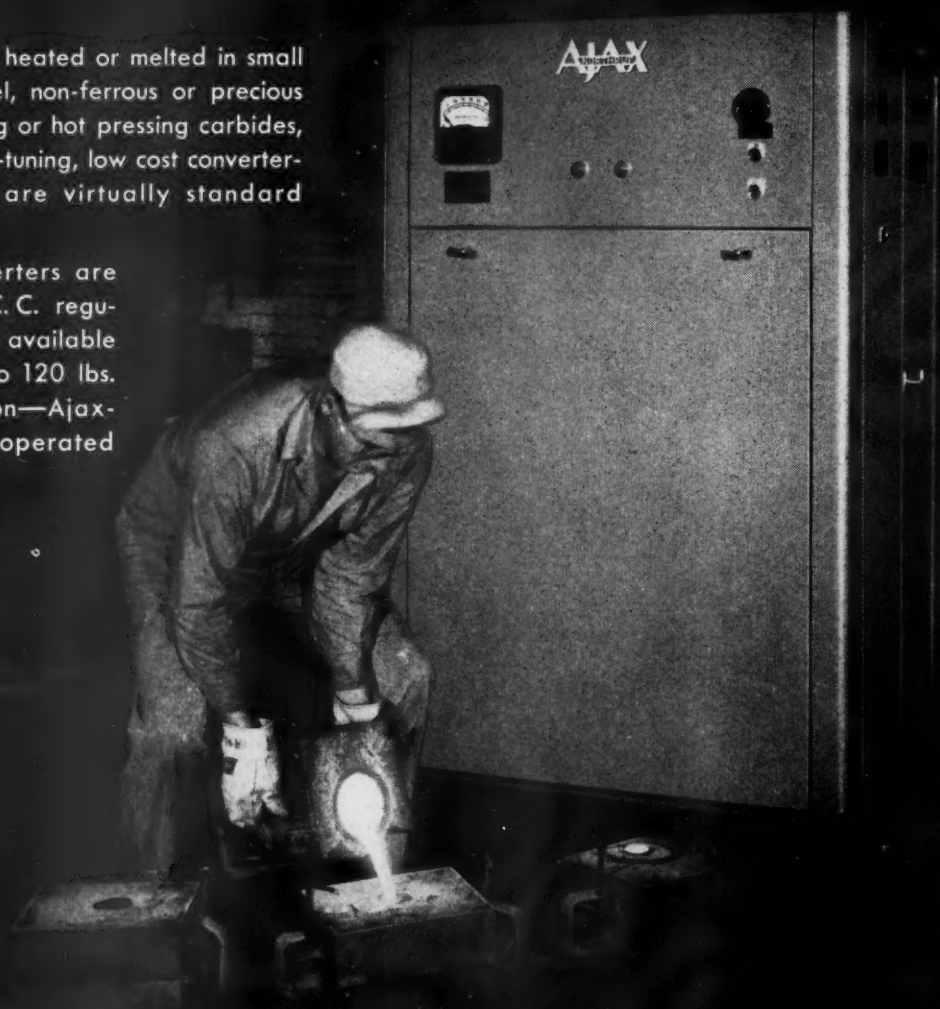
INDUCTION MELTING

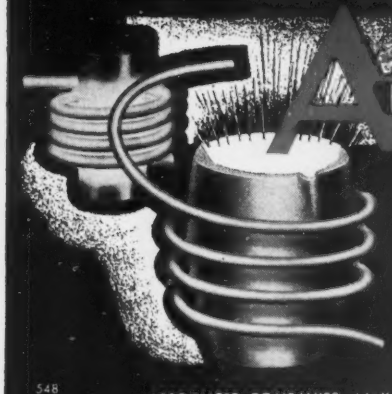
with converter-operated furnaces . . .

Wherever metals are heated or melted in small quantities . . . for steel, non-ferrous or precious metal casting, sintering or hot pressing carbides, brazing . . . these self-tuning, low cost converter-operated furnaces are virtually standard equipment.

Ajax-Northrup converters are certified to meet F. C. C. regulations. Furnaces are available in sizes from 2 ozs. to 120 lbs. (For large production—Ajax-Northrup generator-operated furnaces.)

Write for Bulletin 14.





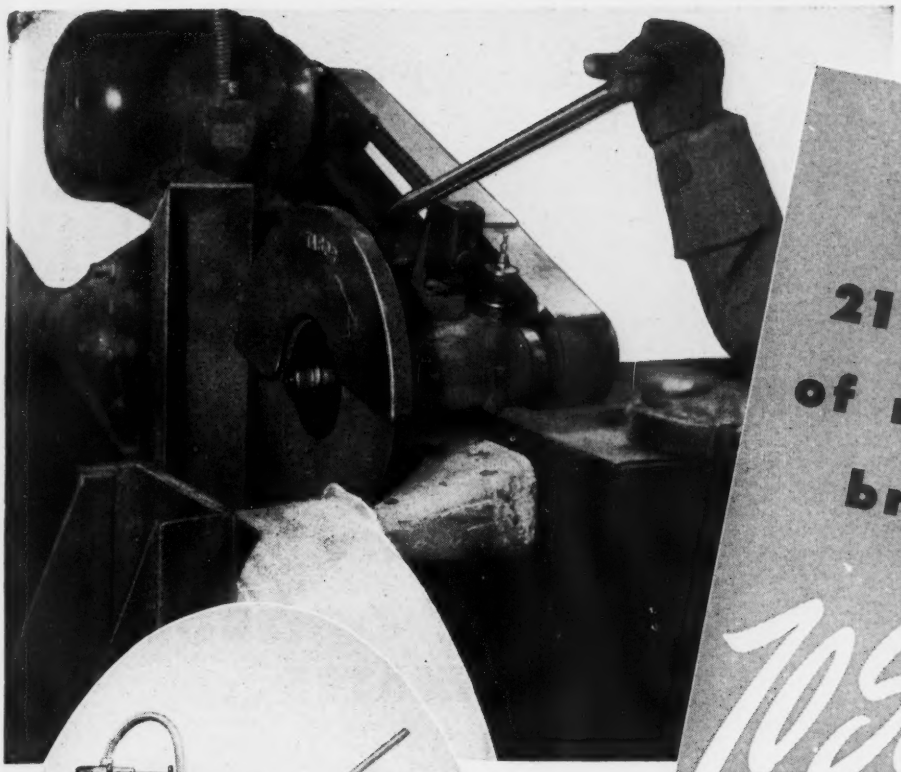
AJAX NORTHRUP SINCE 1916

INDUCTION HEATING-MELTING

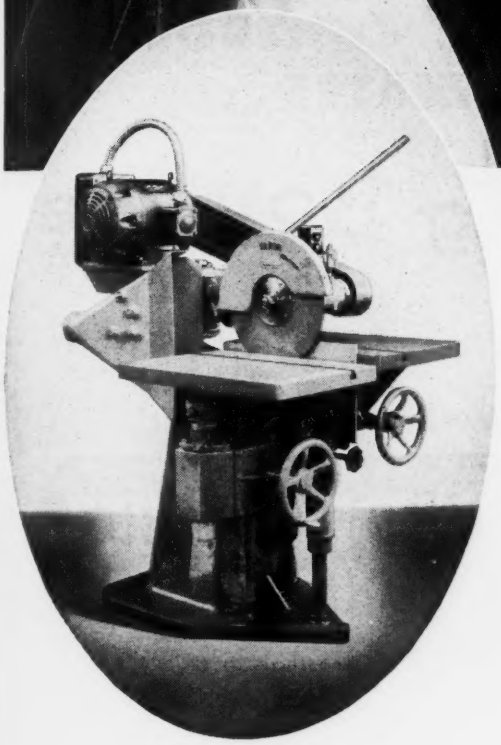
AJAX ELECTROTHERMIC CORPORATION • TRENTON 5, NEW JERSEY

548

ASSOCIATED COMPANIES: AJAX ELECTRIC FURNACE CORPORATION • AJAX ELECTRIC COMPANY • AJAX ENGINEERING CORPORATION



Through 21 sq. inches of manganese bronze in *10 Seconds!*



That's a mighty fast cut for a 16" wheel driven by a 10 H.P. motor—a good example of how top-speed production schedules are "meat" for Tabor-Brasive Cut-Off Machines.

These rugged machines cut gates and risers from non-ferrous and ferrous castings in a matter of seconds. Clean, close cuts, too, that slash snagging and finish-grinding costs to the bone—often do away with them entirely.

And for the *really tough* cutting jobs—in steel foundries—in copper cutting (either gates and risers or crucible feed stock)—wherever the going's the toughest, Tabor makes a big-value 15 H.P. cut-off.

Any way you look at it, a Tabor-Brasive Cut-Off Machine—equipped with today's hard-to-break, safe-to-use wheels—is *your* answer to more cuts at less cost, with safety.
Write, wire or 'phone for more details.

SPECIFICATIONS

Motor	Table Size (Split Type)	Wheel Diam.	Max. Height of Work Under Wheel
10 H.P.	36" x 25"	16" Max. Thickness—5/32"	20" (with head over table) 46" (with head swung to side)
15 H.P. (Two Speed)	41" x 30"	20" Max. Thickness—3/16"	18" (with head over table) 44" (with head swung to side)
All motors fully enclosed, fan-cooled, ball bearing			

Factory representatives in most principal cities. Write us for details and name of our representative nearest you.

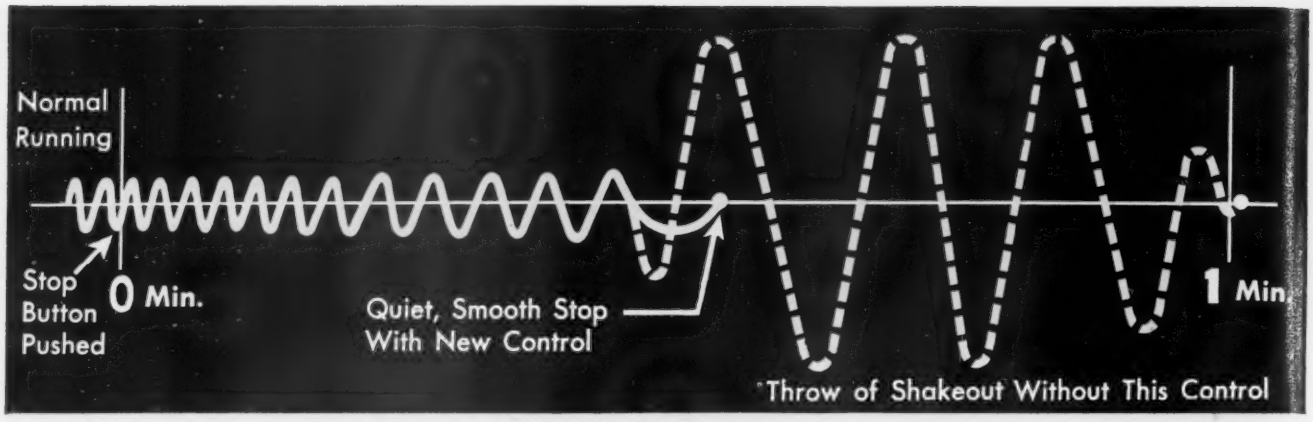
The TABOR Manufacturing Co.

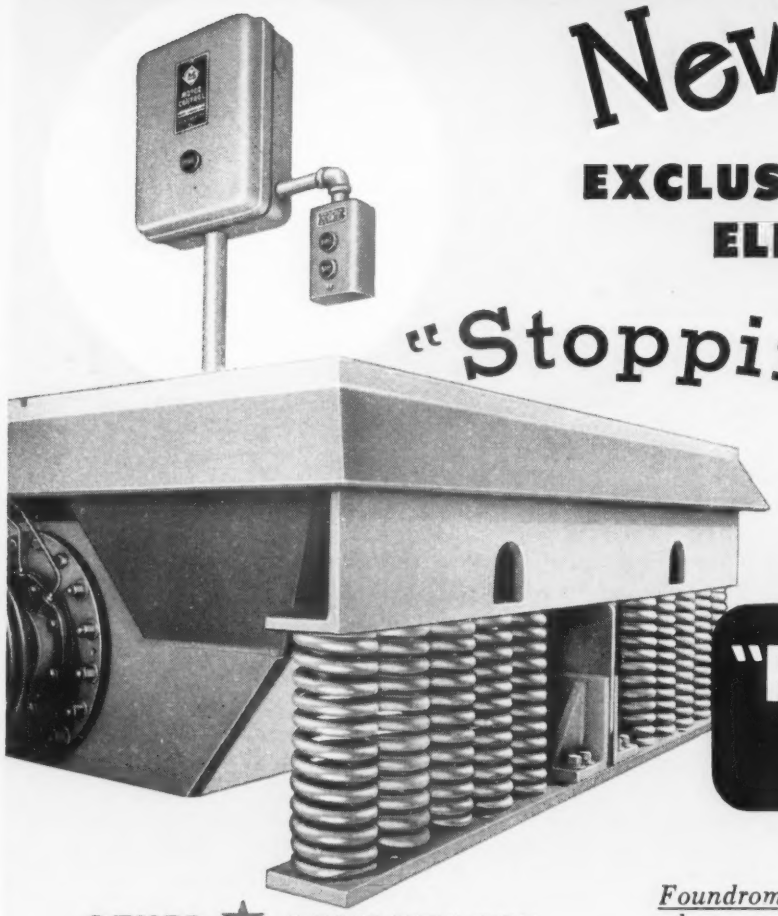
SINCE 1884 MANUFACTURERS OF FOUNDRY MOLDING MACHINES • OUR SEVENTIETH YEAR

6225 TACONY STREET • PHILADELPHIA 35, PENNA.

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

EXPORT DEPARTMENT, 1010 SCHAFF BLDG., PHILA. 2, PA.





New

EXCLUSIVE* CONTROL ELIMINATES "Stopping Bounce"

Smooth...Quiet

"FOUNDROMATIC" SHAKEOUTS

OTHER ★ ADVANTAGES

- ★ Two-bearing *Foundromatic* design — simpler than any other — means only one dust seal, far fewer parts.
- ★ One-piece body construction . . . stress-relieved after welding . . . increases resistance to impact load.
- ★ Vigorous vibration for largest loads within rating — you don't have to buy extra capacity to get rapid shakeout.
- ★ Effective belt tension assured by specially designed pivoted motor base.

*Patented

Foundromatic shakeouts transmit no vibration when running; no vibration when stopping. Allis-Chalmers new exclusive* automatic snubber control reverses the motor to bring the shakeout to a smooth, quiet stop. Actually, electrical energy supplied by the control replaces mechanical snubbers. As a result, maintenance is reduced. Also, both motor and drive last longer. In addition, castings and flasks are not damaged by excessive throw.

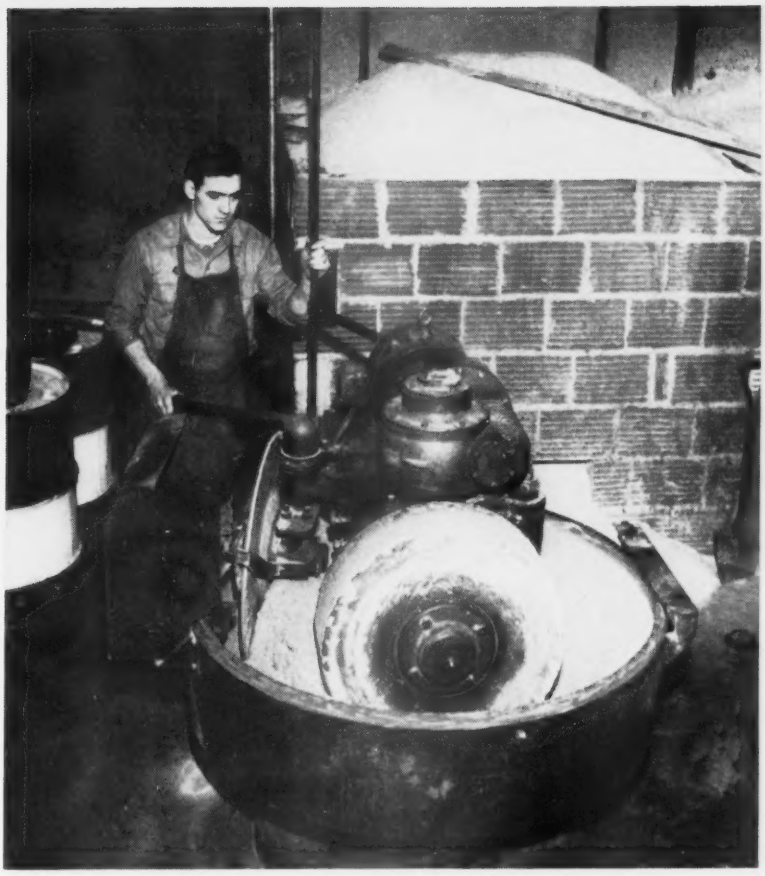
Get complete facts on Foundromatic shakeouts with automatic snubber control from your nearby A-C district office, or write Allis-Chalmers, Milwaukee 1, Wisconsin.

A-4256

Foundromatic is an Allis-Chalmers trademark.

A-C ALLIS-CHALMERS

ALLIS-CHALMERS



This No. 404 Clearfield Mixer has been in operation for eight years in the core shop of the Railway and Industrial Engineering Co. of Greensburg, Pa., makers of electrical switchgear for substations and generating stations. During that time it has required only very few minor repairs and "has paid for itself many times over."

in preparation of foundry sand

The

CLEARFIELD mixer

"Pays For Itself Many Times Over"

By its speed, its dependability, its flexibility—by the high quality sand it turns out—the Clearfield Mixer cuts costs and speeds production. In the unsolicited words of one of our satisfied customers "it pays for itself many times over."

Clearfield Mixers, featuring the famous revolving pan principle, are available in a wide range of sizes. There is a Clearfield Mixer to meet any sand preparation requirement you have, either as a single process or part of an integrated system.

Write today for Catalog No. 83
for complete details.

CLEARFIELD
MIXER

**MIXES, TEMPERS
AERATES**

CLEARFIELD
MACHINE COMPANY

CLEARFIELD
PENNSYLVANIA, U. S. A.

Note how the Auto-Scoop crowds into pile at ground level and can tilt bucket back *before hoisting*. Fast retracting action can actually flip load into bucket, enables operator to obtain full bucket even from small stockpiles.

Lower bucket tilt-back, **lower** carry bring you **higher** daily production

Insure full bucket without traction crowding, improve stability, speed travel.

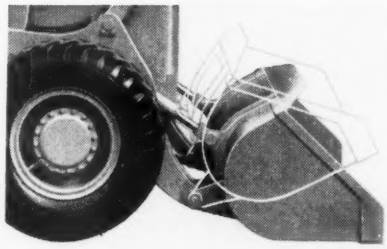
Every feature of the Jaeger 12 cu. ft. Auto-Scoop is specially engineered to cut your cost of bulk handling. A unique advantage is ability to move into material and then retract the bucket independently of hoisting, repeatedly if necessary, at ground level.

Thus, the operator can load stubborn materials *without the traction crowding that causes excessive clutch slippage or tire wear.* He simply works material into the bucket with the tilt-back action as he moves forward. As the bucket fills, traction is increased by the downward thrust on the front driving wheels, right from the start.

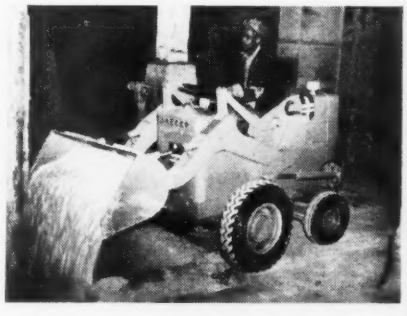
In addition, low-level tilt-back enables the operator to load from small stockpiles or windrows where materials tend to move away — to actually flip the load into the bucket. It also permits carrying full bucket as low as 4½" above the ground, provides lower center of gravity which improves stability in travel, results in faster operation. And in such applications as carrying from stockpile to mill, it avoids the need for repeated hoisting and lowering.

Other features that help you cut handling costs include greater lifting capacity (1200 lbs.), more power (33 hp @ 1800 rpm), faster speeds (to 13.88 mph in reverse, 7.66 forward), shorter turning radius (6'6"), higher clearance (1'6" under lip, 6'8" under hinge) and longer reach (2'7"). Write for Catalog L12-4 and name of the nearest Jaeger Auto-Scoop distributor.

(*Comparisons based on other well-known scoop loaders now in the field.)



How hydraulic pistons retract the bucket independently of hoisting action. By combining tilt-back and hoisting, the most stubborn materials are readily loaded, does away with traction crowding that causes slippage.



Low tilt-back, low carry make it possible to load, travel and unload without repeated hoisting and lowering. Cuts time on many jobs.

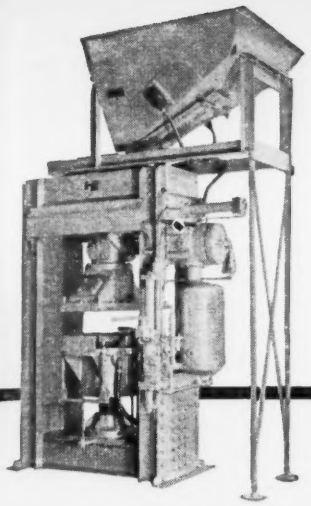
For bigger work, Jaeger offers the 1 cu. yd. Load-Plus, with torque converter, power steering and either front-wheel or 4-wheel drive.

The Jaeger Machine Company, 502 Dublin Avenue, Columbus 16, Ohio

JAEGER LOAD-PLUS *auto-scoop*

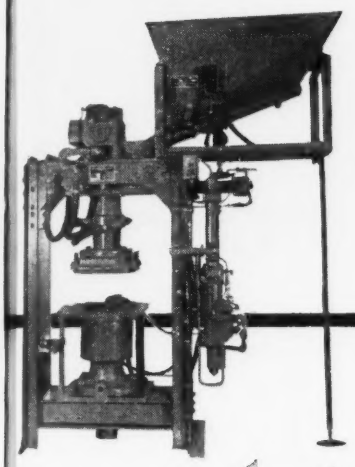
AIR COMPRESSORS • PUMPS • MIXERS • PAVING MACHINES

Distributors throughout U.S. and Canada and Principal Cities of the World



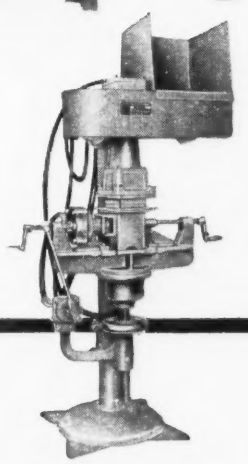
DEMMLER *Model* 100 Series CORE BLOWERS-Available in four sizes

A number one reason for Demmler leadership. The Demmler 100 Series was designed for fast operation on defense project where it was necessary to blow 2,000 cores per hour! Now it is available for faster core blowing in your foundry. Stationery magazine type core blowers capable of blowing ANY core or molding sand.



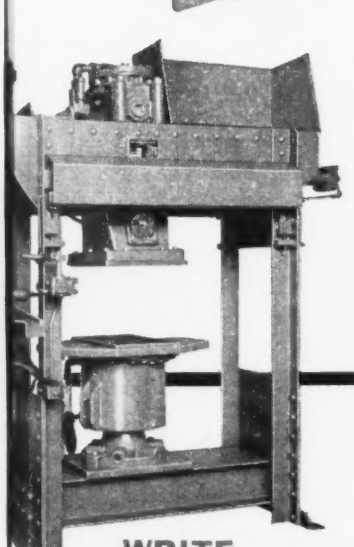
DEMMLER *Model* 1E-OS CORE BLOWER

This core blower is another production pace setter. It can be used with two drag halves so the operator can remove one core while the second core is being blown. Double production because there is no waiting! One push of the starting lever and the machine automatically completes one cycle and the magazine returns to filling position. Write for information about this production-worthy Demmler 1E-OS.



DEMMLER *Model* 55 CORE BLOWER

This little giant is unequalled among competitive core blowers for fast, economical production on short run jobs. The Demmler 55 has one hand valve that operates both vertical and horizontal core box clamps and blows the core—in only 3 seconds! Used for core boxes with depths up to 10", handles cores up to 4 lbs. A wide range of sand magazine bottom openings available to meet all your core box dimensional requirements.



DEMMLER *Model* 2E CORE BLOWER

Built for rugged service without maintenance troubles. The Demmler 2E handles cores up to 20 pounds. Available with manual, semi-automatic or fully automatic controls. The draw cylinder is 11" in diameter and the machine has a 10" stroke. The drawing post is completely enclosed and protected from sand and abrasion to guarantee accuracy and trouble-free operation. Ultra high speed blow valve action increases initial blow pressure 25%.

All models of Demmler Core Blowers can be furnished with vibratory sand feeders as shown above on the 100 series and the 1E-OS.

WRITE

OR LITERATURE • WM. DEMMLER & BROS. • Kewanee, Illinois

FOUNDRIES LOOK TO DEMMLER FOR CORE BLOWERS!

reasons why

Miller AIR CYLINDERS

Ideal For Toughest Foundry Service!

HARD CHROME PLATED PISTON RODS
Prevent Scratch-Damage, Nicks and Rust

DIRT WIPER SEALS
Protect Rods, Seals, Bushings

SOLID STEEL HEADS, CAPS and MOUNTINGS
Eliminate Breakage

BRASS BARRELS
Eliminate Rust and Corrosion

Miller Standard Air Cylinders are so soundly designed and sturdily constructed that, even under the severe abrasive conditions of foundry service, they provide extremely long life without requiring packing replacement or other maintenance.

They are offered in a complete line of "custom-built" units available on normal scheduled delivery in *thousands* of combinations of bore, stroke and mounting to meet every foundry need.

They feature the SPACE-SAVING SQUARE DESIGN originated by Miller in 1945 and fully met the J. I. C. Pneumatic Standards years before their adoption in 1950.

"Stock" Cylinders

In addition to its "custom-built" line, Miller offers identical quality air cylinders "stocked" for *immediate delivery* in 20 popular combinations of bore, stroke and mounting as follows:

NON-CUSHIONED: 2", 2½", 4" and 6" bore sizes each available in 2", 4", 6", 8" and 1[illegible] stroke lengths.

CUSHIONED BOTH ENDS: 2", 3¼", 5", and [illegible] bore sizes each available in 3", 5", 7", 9" and 13" stroke lengths.

Cylinders are base Model A53 with foot, flange and pivot mounting attachments available as desired.

WRITE FOR CYLINDER BULLETINS A-105 and H-104

Complete Miller cylinder line includes: air cylinders, 1½" to 20" bores, 200 PSI operation; low pressure hydraulic cylinders, 1½" to 6" bores for 500 PSI operation, 8" to 14" bores for 250 PSI; high pressure hydraulic cylinders, 1½" to 12" bores, 2000-3000 PSI operation. All mounting styles available.

SALES AND SERVICE FROM COAST TO COAST

CLEVELAND • YOUNGSTOWN • DAYTON • PITTSBURGH • PHILADELPHIA • BOSTON • HARTFORD • NEW YORK CITY • BUFFALO • ST. PAUL • GRAND RAPIDS • DETROIT • FLINT • FORT WAYNE • SOUTH BEND • INDIANAPOLIS • MILWAUKEE • LOUISVILLE • KANSAS CITY • SEATTLE • LOS ANGELES • SAN FRANCISCO • BALTIMORE • DENVER • ST. LOUIS • MOLINE • CHICAGO • HOUSTON • TORONTO, CANADA and OTHER AREAS

MILLER FLUID POWER CO.
(Formerly MILLER MOTOR COMPANY*)*

2034 N. HAWTHORNE AVE., MELROSE PARK,

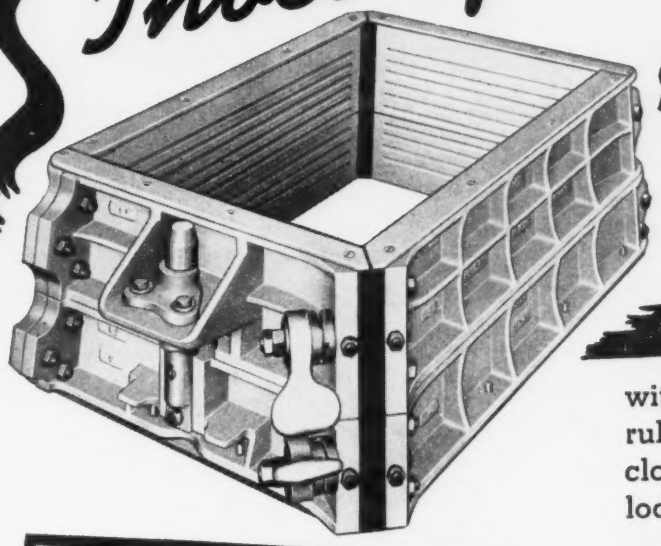
AIR & HYDRAULIC CYLINDERS • BOOSTERS • ACCUMULA[illegible]
COUNTERBALANCE CYLINDERS

July

Investigate

the new

FREMONT SPREADLOCK FLASK



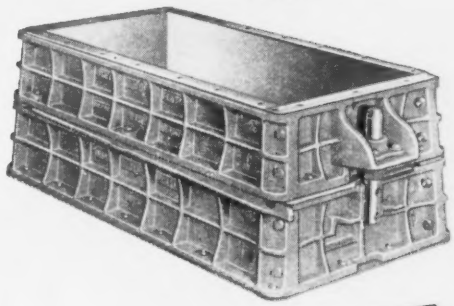
with the long-life, easily replaceable, live-rubber corner inserts which completely close the corner gaps so that no sand can lodge in the open corners.

PERFECT ALIGNMENT Indefinitely!

is guaranteed by the one-inch GROOV-LOCK FOOLPROOF PIN on

FREMONT STANDARD SLIP FLASKS

They are particularly adapted to cope or drag pattern jobs. Other types of standard pin fittings are also available. Solid, bolted and welded corner construction is a feature of Fremont Standard Slip Flasks.



Fremont Magnesium Flasks point the way to more exacting work. Accurately machined inside surfaces and flanges. Steel-faced top and bottom flanges. Magnesium has twice the tensile strength of aluminum, thus assuring longer service, and magnesium weighs 1/3 less than aluminum, making for easier handling.

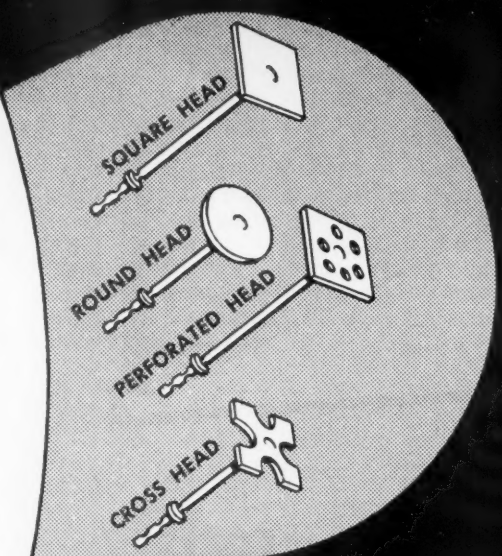
Write today for free literature and prices.
All orders given prompt attention.

THE FREMONT FLASK COMPANY

FREMONT, OHIO

MILWAUKEE RADIATOR CHAPLETS

give you an *EXTRA* measure of Quality



For Automotive Castings, Stove Castings, Radiator Castings, or when any light pressure high quality castings are desired, be sure to specify MILWAUKEE CHAPLETS and get the very best in shoulder radiator chaplets.

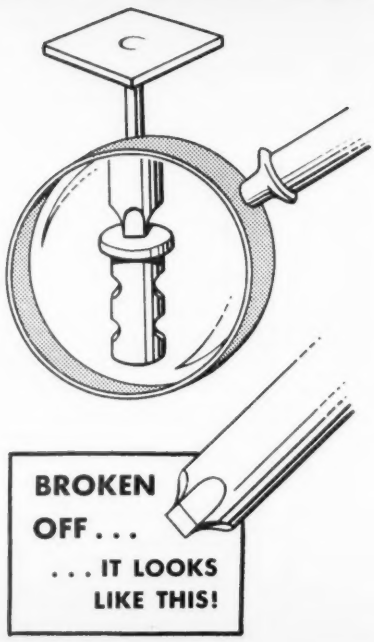
They're precision made of laboratory controlled materials by skilled craftsmen using the most modern manufacturing facilities. You get these outstanding advantages:

• Rigid Specifications • Burr-Less Construction • Clean Break-Off Nicks • Five Inspections • Best Materials for Easy Fusions • Large Dia. of Shoulder for Easy Seating • Thin Shoulders Mean Less Grinding.

NOT ONLY NEW BUT ALSO TRUE

A TRUE FOUR-WAY BREAK-OFF NICK!

Developed at the request of a large Automotive Company, this is a true four-way nick for easy break-off.



MILWAUKEE CHAPLETS

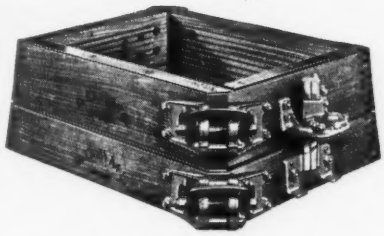
MILWAUKEE CHAPLET & MFG. CO., INC. 1025 S. 40th STREET
MILWAUKEE 15, WISCONSIN

LARGE OR SMALL

ADAMS CHERRY EASY-OFF FLASKS

with ADAMS JACKETS

CAST IRON OR ALUMINUM

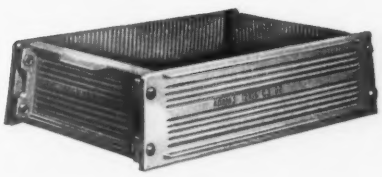


Patent No. 2393200
Other Patents Pending

ADAMS CHERRY EASY-OFF FLASK

Pin and Ear arrangement supplied to suit your present pattern plates. (Write us today for our circulars on Cherry Easy-Off Flasks and Cast Iron or Aluminum Jackets.)

To Complete a winning combination



The ADAMS Company

ESTABLISHED 1883

MOLDING MACHINES and FLASK EQUIPMENT

700 FOSTER STREET, DUBUQUE, IOWA, U.S.A.

Another revolutionary development . . . for

SLOW SPEED *snagging of* **GRAY IRON** *and* **MALLEABLE IRON**

The new NORTON K BOND†

adds the "TOUCH of GOLD" that raises wheel-life and efficiency to new highs on gray and malleable iron slow speed snagging jobs

As Good As They Look! You'll know Norton K Bond CRYSTOLON wheels by their distinctive appearance, as well as by their greatly stepped-up performance. Now available in standard vitrified wheel sizes for floor and bench stands and swing frames, as well as in smaller sizes and cones for portable grinders.

Now, after years of continuous development, the new Norton K Bond is ready to bring you faster, freer cutting action and much longer wheel-life on your slow speed gray and malleable iron rough grinding jobs.

It's the most radically improved vitrified bond ever produced for these applications — and so ideally suited to them that CRYSTOLON* wheels bonded with it are far ahead, from every performance angle, of any wheels you ever used before.

5 big advantages of K Bond CRYSTOLON wheels

1. Faster, freer cutting action
2. Much longer wheel-life
3. Less frequent dressing
4. Hold corners better
5. Consistently duplicated

Already the new K Bond wheels have been thoroughly job-tested, on a wide range of floor stand and bench stand jobs, in foundries throughout the country. And report after report shows that these new wheels are consistently outlasting other wheels, grinding off more metal per dollar and cutting production costs on countless every-day slow speed gray iron and malleable iron grinding jobs.

Try the new K Bond in your cleaning room

The "Touch of Gold" Is Job-Proved. During extensive field testing, the new Norton K Bond CRYSTOLON wheels have made a big hit with operators experienced in rough grinding malleable and gray iron castings. Why not get first-hand reports on these greatly improved wheels? Try them on your own floor stands and bench stands.

PERFORMANCE IS THE PAY-OFF!

Read these reports on tests of K Bond CRYSTOLON wheels made in users' cleaning rooms

From a large eastern piston ring plant:
Ground on the average 11,000 more rings with a K Bond wheel than with any wheel formerly used. Best wheel yet on Lehman piston ring grinders. Re-ordering 100.

From a leading malleable iron foundry:
Lasted 20% longer than previous standard wheels. Very good wheels in every respect.

From a southern gray iron foundry:
K Bond wheels easily the best ever used. Re-ordered in 40-wheel quantities.

From an eastern gray iron foundry:
Increased wheel-life from 80 to 120 hours. Reduced operator fatigue. Several 50-wheel quantity re-orders.

From a middle-western foundry:
K Bond wheels excellent performers. Proved faster cutting. Lasted a week longer than other wheels under same conditions.

See your Norton Distributor

about arranging a test of the new K Bond CRYSTOLON wheels in your plant. Or write to NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities, listed under "Grinding Wheels" in your phone directory, yellow pages. Behr-Manning Corporation, Troy, N. Y., is a division of Norton Company. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass. W-1562

NORTON
ABRASIVES
Making better products... to make other products better

†Patent applied for
*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

COLEMAN OVENS

reduce waste . . . lower costs

in every type of foundry

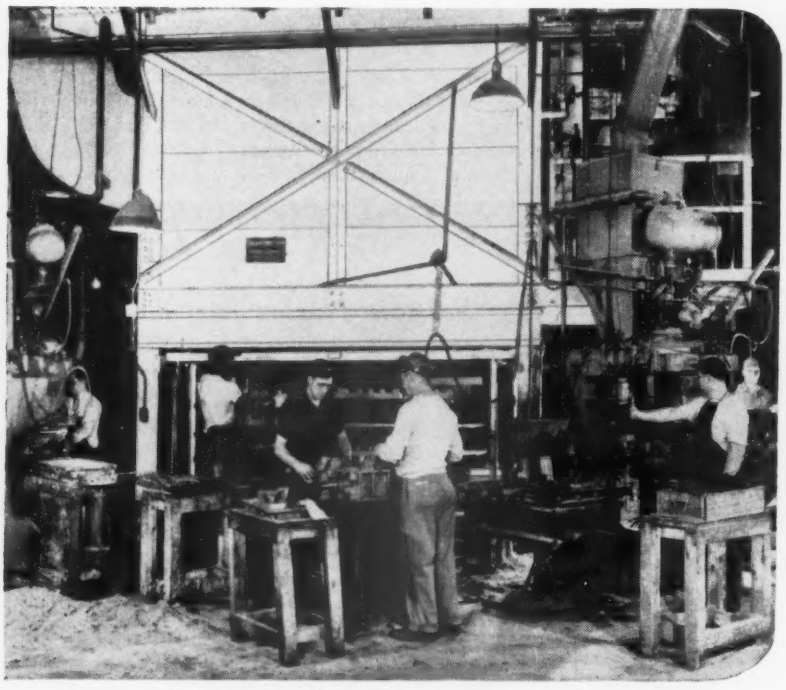
You can reduce casting scrap . . . cut your labor, material and fuel costs by baking cores and drying molds in Coleman Ovens. Small and large foundries alike find that Coleman Ovens are vital to better quality castings and increased profits.

Coleman Ovens quickly pay for themselves out of direct savings in labor, materials and reduced casting scrap.

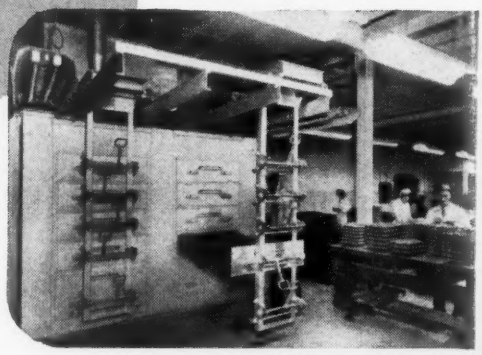
Coleman Engineers have pioneered and developed the most efficient oven designs to meet the highly specialized needs of modern foundry methods in all classes of work — grey iron, malleable, steel, alloy, brass, aluminum and magnesium.

Profit by this experience — let us recommend, at no obligation, the Coleman Oven for your needs.

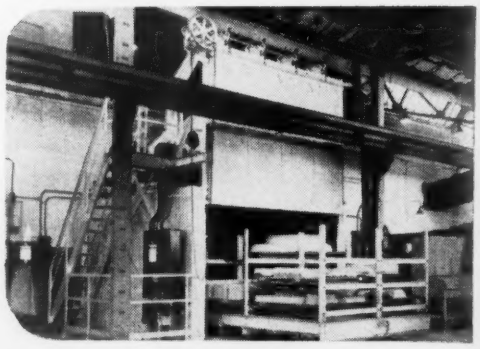
Write for Bulletin 54



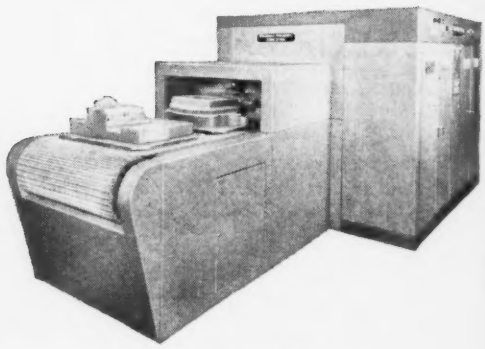
Coleman Tower® Oven in Automotive Foundry



Coleman Rolling Drawer Ovens in Brass Fittings Foundry



Coleman Car-Type Oven in Steel Foundry



Coleman Dielectric Core Oven in Aluminum Foundry

A COMPLETE RANGE OF TYPES AND SIZES

for every core baking and mold drying requirement:

Tower Ovens • Horizontal Conveyor Ovens
Car-Type Core Ovens • Car-Type Mold Ovens
Transrack Ovens • Rolling Drawer Ovens
Portable Core Ovens • Portable Mold Dryers
Dielectric Core Ovens

THE FOUNDRY EQUIPMENT COMPANY
1821 COLUMBUS ROAD CLEVELAND 13, OHIO

WORLD'S OLDEST AND LARGEST FOUNDRY OVEN SPECIALISTS

"...completely sold on Pangborn Blastmaster® Barrel"

—says Bamber Foundry

That's exactly how foundryman Ronald Bamber, owner of Bamber Foundry, Stamford, Conn., feels about his Pangborn Blastmaster Barrel. He says, "We are getting 25% faster blast cleaning, which means 25% more production, and have eliminated the full-time labor costs of one man. Figuring everything, we estimate this new machine is operating for considerably less maintenance costs. The steel mesh door is wonderful, first really abrasive-tight door we've seen."

Mr. Bamber goes on to say the Blastmaster gives them excellent cleaning quality and is economical on abrasive. No wonder Bamber is sold on the Blastmaster.

You, too, will be sold on the Pangborn Blastmaster! For *cheaper* cleaning—for *faster, better* cleaning—investigate the Blastmaster Barrel, available in 1½, 3, 6, 12, 18 and 27 cu. ft. capacities. Write for Bulletin 223 now to: PANGBORN CORPORATION, 1400 Pangborn Blvd., Hagerstown, Md.

For better cleaning at lower cost, Pangborn recommends the use of Malleabrasive in your Blastmaster.

Pangborn

BLAST CLEANS CHEAPER

with the right equipment for every job

MEMBER FEMA

APPROVED and PROVED
NATION WIDE!

"SW" CUPOLA COLLECTOR PICKED FOR PERFORMANCE AND MONEY-SAVING VALUE

More and more foundries, small and large, are realizing the benefits from the performance of Schneible "SW" Cupola Collectors for control of cupola fly-ash and smoke.

Since such improvements are major expenditures it is important that purchase of *Cupola Collector* equipment be based on *proved performance* to assure maximum dollar value with minimum maintenance, and long usefulness.

Be sure to investigate the many benefits that are yours with Schneible "SW" Cupola Collectors, before you decide on any *similar* equipment. Only Schneible patented features gives you all the money-saving advantages.

YOUR BULLETIN ON REQUEST

For the complete story on the "SW" Cupola Collector write today for your copy of Bulletin No. 554.

CLAUDE B. SCHNEIBLE COMPANY
P. O. Box 81, North End Station Detroit 2, Michigan

EUROPEAN LICENSEE: ELEX S. A., ZURICH, SWITZERLAND
CABLE ADDRESS FOR FOREIGN INQUIRIES: CBSCO

SCHNEIBLE

PRODUCTS
Multi-Wash Collectors • Uni-Flo Standard Hoods • Uni-Flo Compsensating Hoods • Uni-Flo Fractionating Hoods • Water Curtain Cupola Collectors • Ductwork • Velocitrap • Dust Separators • Entrainment Separators • Settling and Dewatering Tanks • "Wear-Proof" Centrifugal Slurry Pumps

LATE NEWS

JUNE 25 1954

FEWER ACCIDENTS: Safety record of foundries improved substantially during the first quarter, according to the U. S. Department of Labor. Steel foundries cut their accident frequency rate to 16 from 22.2 a year ago. Rate for gray iron and malleable foundries dropped from 29.9 to 25.6 and that for nonferrous foundries from 22.7 to 16.5 Average rate for all manufacturing reached a new low of 11.8 against 12.1 in the 1953 period. Accident frequency for steel mills was only 4.7.

NEW FOUNDRY: The Bullard Co., large machine tool builder which for some time has operated a gray iron foundry at Bridgeport, Conn., is planning to construct a new and modern foundry at Fairfield, Conn. The new plant, expected to cost about $6 million, is scheduled to be in operation by late 1955.

CHANGES NAME: American Car & Foundry Co., originally incorporated in 1900, has changed its name to ACF Industries Inc. The company has foundries in Detroit, St. Louis, Berwick, Pa., and Huntington, W. Va., but its interests extend beyond the railroad field through such subsidiaries or divisions as Carter Carburetor Corp., Avion Instrument Corp., ACF Electronics and the recently acquired WKM Co., high-pressure valve manufacturer of Houston, Tex.

MODERNIZATION: Homestead Valve Mfg. Co. Inc., Coraopolis, Pa., has begun a long-term modernization program which will be completed late in 1955. As part of this project, Homestead has installed two new heaters in its foundry, purchased new sand handling equipment and improved pattern shop facilities. Future foundry improvements will include new production equipment, fresh painting and installation of recreational facilities and new locker rooms. Machine shop operations at Homestead are also being modernized.

FOUNDRY CLOSES: Lancaster Malleable & Steel Corp., Lancaster, N. Y., has discontinued operations. The corporation was formed in 1927, acquiring its plant from the American Brake Shoe Co. Stockholders are to meet to act on the disposal or liquidation of the business.

CLOSING UP SHOP: U. S. armed services had 61 metal scrap processing facilities in March, but 17 were being discontinued. The scrap industry is hopeful that all but a few of the remainder will be closed and get the government out of competition with private business. The Department of Defense appropriation bill for fiscal 1955 contains an amendment prohibiting spending of funds for operation of facilities in the United States for scrap preparation. An exception to the amendment will permit operation of facilities in isolated locations where there are no scrap dealers to handle the scrap. The measure is expected to be approved by Congress.

NICKEL REGULATION: Holders of 100 pounds or less of primary nickel, obtained under a defense priority rating and later found unusable for a defense contract, no longer need report such quantities to the ferroalloys branch of the BDSA. If the material cannot be used for defense contracts, it may be otherwise used or disposed of without BDSA consent.

CONSULTANT: Col. William R. Martin, U. S. Army retired, has gone with the Bureau of Foreign Commerce. On loan to the Foreign Economic Administration, he will serve the Israeli government as industrial consultant in its metalworking industry. For a number of years engaged in metallurgical, production and engineering work for American Steel Foundries, Col. Martin was in charge of all Army Ordnance production in the Cincinnati Ordnance District during World War II.

SAND SCHOOL: Harry W. Dietert Co. will present again its popular sand school in Detroit, Aug. 9-11. Three-hour sessions will be held mornings and afternoons of the three days at the Engineering Society of Detroit under the direction of Frank S. Brewster, general manager of the company. Application of

practical sand control to foundry operations will be the theme of the course. Reservations should be addressed to the company at 9330 Roselawn Ave., Detroit 4.

ALUMINUM IN THE AIR: Aircraft builders consumed 350,000 tons of aluminum the last two years in turning out 29,000 planes. A report by the Republic Aviation Corp. points out that this is almost one-sixth of all the aluminum produced in the period. About 750,000 direct aircraft workers are said to be employed today; including those making parts and equipment in allied industries the total is estimated at over 3 million.

HANDLING SHOW: Material Handling Institute has announced it will organize and sponsor a Material Handling Show to be held in Cleveland's Public Auditorium next year, June 4-7.

PERSONALS: Marshall Post has retired as vice president in charge of operations for the Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa. A steel foundryman for more than 50 years, he is a past president of the AFS . . . Thomas Drever, chairman, American Steel Foundries, is chairman of the steel foundries division in the 1954 campaign to raise $950,000 for the public service program of the National Safety Council . . . David F. Snow, Philadelphia, district manager for the Bridgeport Brass Co., is on loan to the BDSA as director of the Copper Division.

MISCELLANY: A new leaflet, "Gas Welding of Cast Iron," has been issued by the Small Business Administration and is available at SBA field offices . . . Price reductions ranging up to more than 60 per cent have been made on cesium-137 radiographic sources by Tracerlab Inc., Boston . . . Deliveries of new domestic freight cars in May totaled 3173, against 4038 in April and 6582 a year ago, while orders totaled 1071 cars, according to the American Railway Car Institute . . . Production of primary aluminum in the U. S. reached an all-time record of more than 250 million pounds in May, nearly 20 per cent more than a year ago, the Aluminum Association reports.

PRICES OF FOUNDRY METALS AND COKE

(As of June 25, 1954)

FOUNDRY COKE

(Per net ton, f.o.b. ovens)

BEEHIVE	
Connellsville	$16.50-17.00
OVEN	
Birmingham	$22.65
Chicago	24.50
Detroit	25.50
Erie, Pa.	25.00
Everett, Mass.	23.50
Indianapolis	24.25
Kearney, N. J.	24.00
Milwaukee	25.25
Painesville, O.	25.50
Philadelphia	23.00
Portsmouth, O.	24.00
St. Louis	26.00
St. Paul	23.75
Swedeland, Pa.	23.00
Terre Haute, Ind.	24.05

PIG IRON

(Per gross ton f.o.b. furnace)

	No. 2 Foundry	Malleable
Bethlehem, Pa.	$58.50	$59.00
Birmingham	52.88	....
Buffalo	56.50	57.00
Chicago	56.50	56.50
Cleveland	56.50	56.50
Everett, Mass.	61.25	61.75
Fontana, Calif.	62.50	....
Geneva, Utah	56.50	....
Granite City, Ill.	58.40	58.90
Lone Star, Tex.	52.50	52.50
Neville Island (Pittsburgh)	56.50	56.50
Steelton, Pa.	58.50	59.00
Swedeland, Pa.	58.50	59.00
Toledo, O.	56.50	56.50
Troy, N. Y.	58.50	59.00
Youngstown, O.	....	56.50

NONFERROUS INGOT

(Cents per pound, carlots)

BRASS AND BRONZE: Red brass, No. 115, 27.00; tin bronze, No. 225, 39.00; No. 245, 33.25; high-leaded tin bronze, No. 305, 31.50; No. 1 yellow, No. 405, 23.25; manganese bronze, No. 421, 28.75.

ALUMINUM: 99 per cent plus, primary ingots 21.50c. Secondary No. 12 alloy 19.25-19.75. Deoxidizing grades: No. 1 20.00-20.50; No. 4 17.00-17.50.

MAGNESIUM: 99.8 per cent standard ingots 27.00c, f.o.b. Freeport, Tex.

COPPER: Electrolytic 30.00, delivered Connecticut valley.

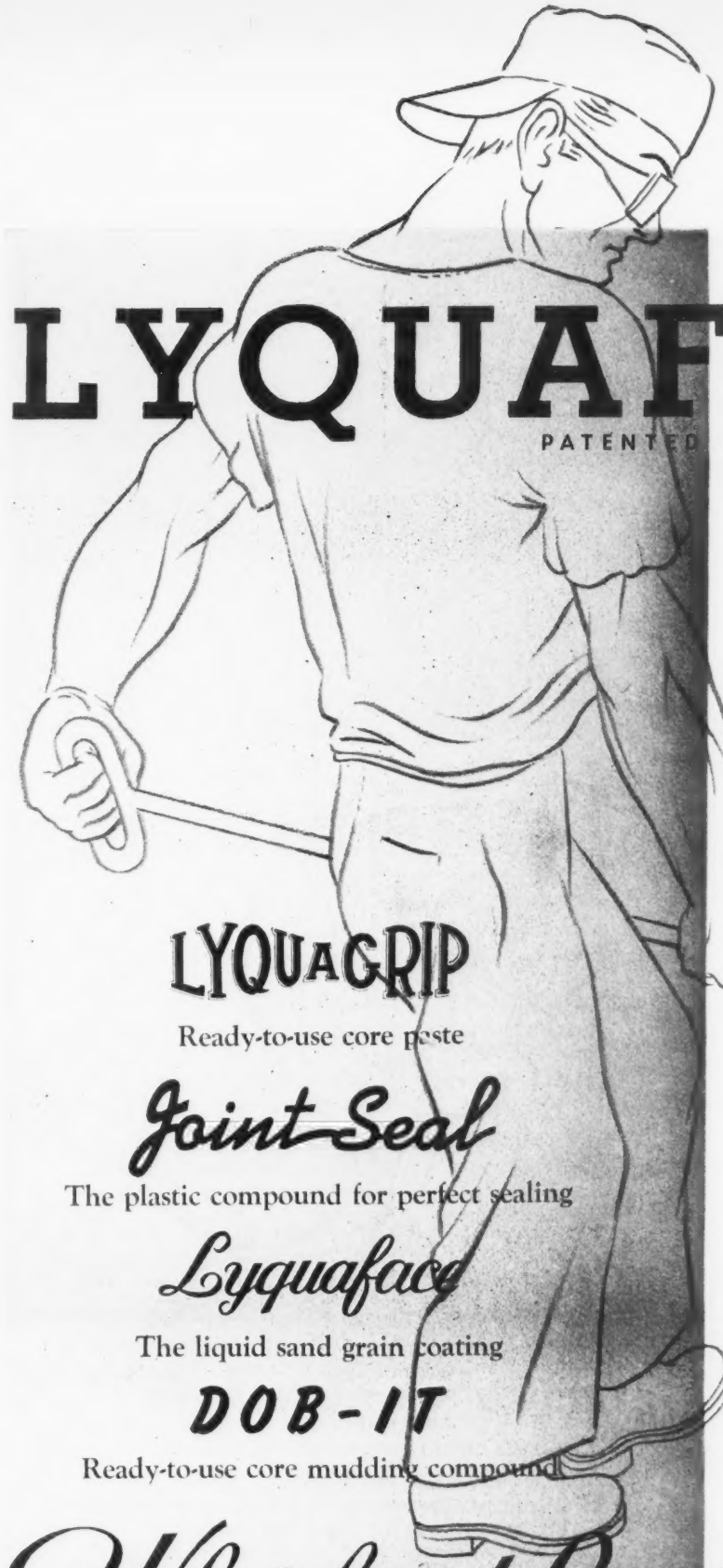
ZINC: High grade 12.35, delivered. Die casting alloy 15.00, delivered.

IRON AND STEEL SCRAP

(Consumer prices per gross ton delivered, except as otherwise noted)

	No. 1 Heavy Melting Steel	No. 1 Cupola Cast	Heavy Breakable Cast	Clean Auto Cast	Machinery Cast	Malleable	Short Steel Rails
Birmingham	$23.50-24.50	**$43.50-44.50	.....	.....	.....	.....	$40.00-41.00
Boston*	**17.00	**29.00-30.00	.....	.....	**32.00-33.00	.....	.....
Buffalo	26.00-27.00	**37.00-38.00	.....	.....	**41.00-42.00	.....	40.00-41.00
Chicago	30.00-32.00	38.00-39.00	.....	40.00-42.00	41.00-42.00	40.00-42.00	44.00-46.00
Cincinnati*	**27.00-28.00	**38.00	.....	.....	**45.00	.....	44.00-45.00
Cleveland	27.00-28.00	40.00-41.00	25.50-26.50	42.00-43.00	42.00-43.00	41.00-42.00	44.00-48.00
Detroit*	**21.00	**33.00	**24.00	**37.00	.....	**28.00	.....
Los Angeles	20.00	38.00-42.00	.....	.....	.....	.....	.....
New York*	17.00-18.00	29.00-30.00	.....	.....	.....	.....	.....
Philadelphia	23.00	35.00	35.50	.....	.....	37.00	41.00
Pittsburgh	29.00-30.00	36.00-37.00	31.00-32.00	.....	43.00-44.00	.....	43.00-46.00
St. Louis*	26.50	37.00	29.00	39.00	.....	.....	41.00
San Francisco	20.00	41.00-43.00	36.00	39.00	43.00	.....	.....
Seattle	23.00	**30.00-35.00	**25.00	.....	.....	.....	.....

* Brokers' buying prices. ** F.o.b. shipping point.



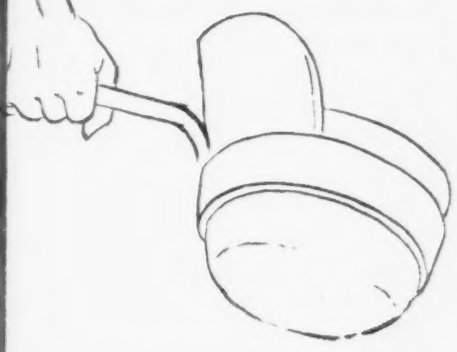
Established 1841

LYQUAFLOUR

PATENTED

This *ONE* additive to sand has all the properties of several other products

1. **LYQUAFLOUR** permits the use of ONE carbonaceous material to obtain the properties of several.
2. **LYQUAFLOUR** peels your casting.
3. **LYQUAFLOUR** corrects expansion problems.
4. **LYQUAFLOUR** permits hard ramming.
5. **LYQUAFLOUR** imparts flowability to sand.



6. **LYQUAFLOUR** requires no rigid control.
7. **LYQUAFLOUR** being slightly moist is not dirty or dusty.
8. **LYQUAFLOUR** is not subject to spontaneous combustion.

You owe it to yourself to investigate our claims.

LYQUAGRIP

Ready-to-use core paste

Joint-Seal

The plastic compound for perfect sealing

Lyquaface

The liquid sand grain coating

DOB-IT

Ready-to-use core mudding compound

Whitehead Brothers Company

NEW YORK OFFICE
324 West 23rd St., New York 11, N. Y.

NEW ENGLAND OFFICE
17 Exchange Place, Providence 1, R. I.

SITUATION UNDER CONTROL BY KEOKUK

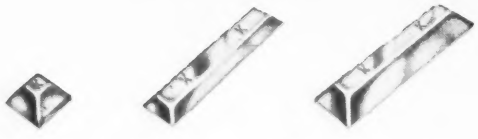
CHIEF KEOKUK:
"Me no need teach Little Chief—him say modern generation learn make teepee on TV!"

PRprincess WENATCHEE:
"As usual he has the situation well under control!"

KEOKUK K ELECTRO-METAL COMPANY

KEOKUK, IOWA
WENATCHEE DIVISION, WENATCHEE, WASHINGTON

The way for *you* to keep the cost and quality situation under control is to use Keokuk Silvery Pig Iron! Due to it being a less concentrated form of silicon, it assures *less* silicon waste. Car for car, pig for pig, its uniformity *never* varies. Charge it by magnet or count.



Keokuk Silvery . . . the superior form of silicon introduction for steel plants and foundries . . . available in 60 and 30 lb. pigs and 12½ lb. piglets . . . in regular or alloy analysis. Keokuk also manufactures high silicon metal.

SALES AGENT: MILLER AND COMPANY

332 S. Michigan Ave., Chicago 4, Illinois
3504 Carew Tower, Cincinnati 2, Ohio
823 Forsyth Blvd., St. Louis 24, Missouri

MICHIGAN *bucket control means "Bigger Loads . . . . . FASTER"*

Watch a MICHIGAN Tractor Shovel at work —with particular attention to bucket action —and you'll *see* how a MICHIGAN* will *handle bigger loads, move more yardage*—faster, at considerably lower cost.

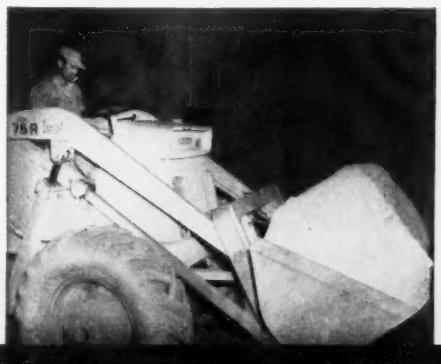
- *Tremendous break-out power*—ram the cutting edge into any tough, hard-to-dig clay, shale or loose rock—and *work the bucket* to loosen it
- *Bucket roll-back at ground level*—pick up and transport full buckets at low center of gravity for safe traveling, no void space in the bucket; more work in less time
- *Remarkable digging ability*—two large double acting cylinders on bucket and two large double acting cylinders on main lift give excellent control and superior digging action.
- *Good bucket height and reach*—high dumping clearance and ample forward reach make trucks easy to load.

Check these outstanding Quality Features of MICHIGAN* Tractor Shovels . . .

1. **Superior Bucket Action**—bigger loads, faster loading
2. **Clark Power-Shift Transmission**—faster operating cycle gets more yardage
3. **Clark Torque Converter**—3-to-1 torque multiplication; power *when needed*—no conventional clutch
4. **Clark Planetary Axle**—relieves torque load on shafts and gears, prolongs machine life
5. **Power Steering**—much easier handling, lessens driver fatigue
6. **Gas or Diesel**—right power for the job; more horsepower than any comparable machine

Six models: capacities from 1.5 cubic feet to 2¼ cubic yards. Facts about the MICHIGAN Tractor Shovel are important—and interesting. The MICHIGAN Fact Folio contains specifications and action photos. The coupon gets it for you.

**A Trademark of Clark Equipment Company*

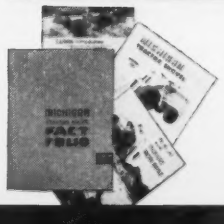


CLARK EQUIPMENT

16A

CLARK EQUIPMENT COMPANY
Construction Machinery Division
442 Second Street, Benton Harbor, Michigan

Please send the MICHIGAN Tractor Shovel Fact Folio



Name_____ Title_____

Firm_____

Address_____

City_____ County_____ State_____

1854 *100 Years* 1954

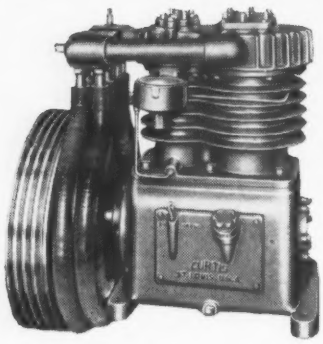
OF SUCCESSFUL MANUFACTURING EXPERIENCE

GET MORE PRODUCTION...PER MAN-HOUR

with the help of dependable, efficient

Curtis

AIR COMPRESSORS • AIR CYLINDERS • AIR HOISTS



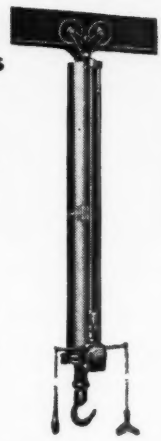
MORE AIR AT LESS COST...
with powerful, precision-built *Curtis* compressors

- available up to 50 H.P.
- improved — two-stage design delivers more air per horsepower
- air-cooled — no freeze up — low-cost installation and operation
- Timken tapered main bearings permit external adjustment
- pressure lubricated rod and piston bearings for long life

Tank mounted compressors
¼ through 15 horsepower
Simple compressors
¼ through 50 horsepower

TO LIFT, LOWER, PUSH, OR PULL *Curtis* Air Cylinders or Air Hoists Will Do The Job Quickly, Easily, and Economically — capacities up to 10 tons.

- low-cost trouble-free operation
- smooth and delicate control
- cylinders, ground and polished
- disc-type valves lapped to seat



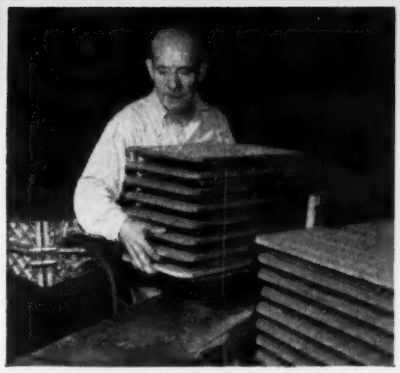
Pendant Air Hoist... ideal for any lifting or lowering application.

Bracketed Air Cylinder can be mounted horizontally or vertically for lifting, lowering, pushing, or pulling.

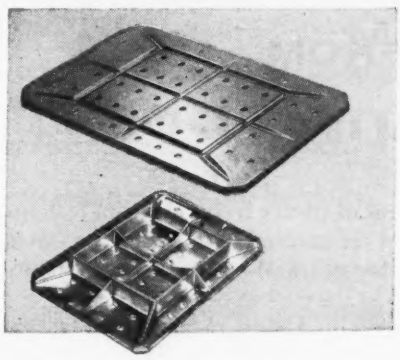
FOR COMPLETE INFORMATION on how Curtis equipment can make your production more profitable, write today...

CURTIS PNEUMATIC MACHINERY DIVISION
of Curtis Manufacturing Company
1922 Kienlen Avenue, St. Louis 20, Missouri

755



Molder finds EDCO Dowmetal Bottom Boards are light, easy to handle and stack.



"We cut our board losses from 7500 down to 12 . . . by switching to EDCO Dowmetal Bottom Boards"

— says R. D. BAYSINGER, Manager, Foundry Division
GREENLEE BROS. & CO., ROCKFORD, ILLINOIS

Analysis of five-year records at the Foundry Division of Greenlee Bros. & Co. revealed a loss of only 12 Edco Dowmetal Bottom Boards, in contrast to a normal loss of 7500 wood boards during the same period of time.

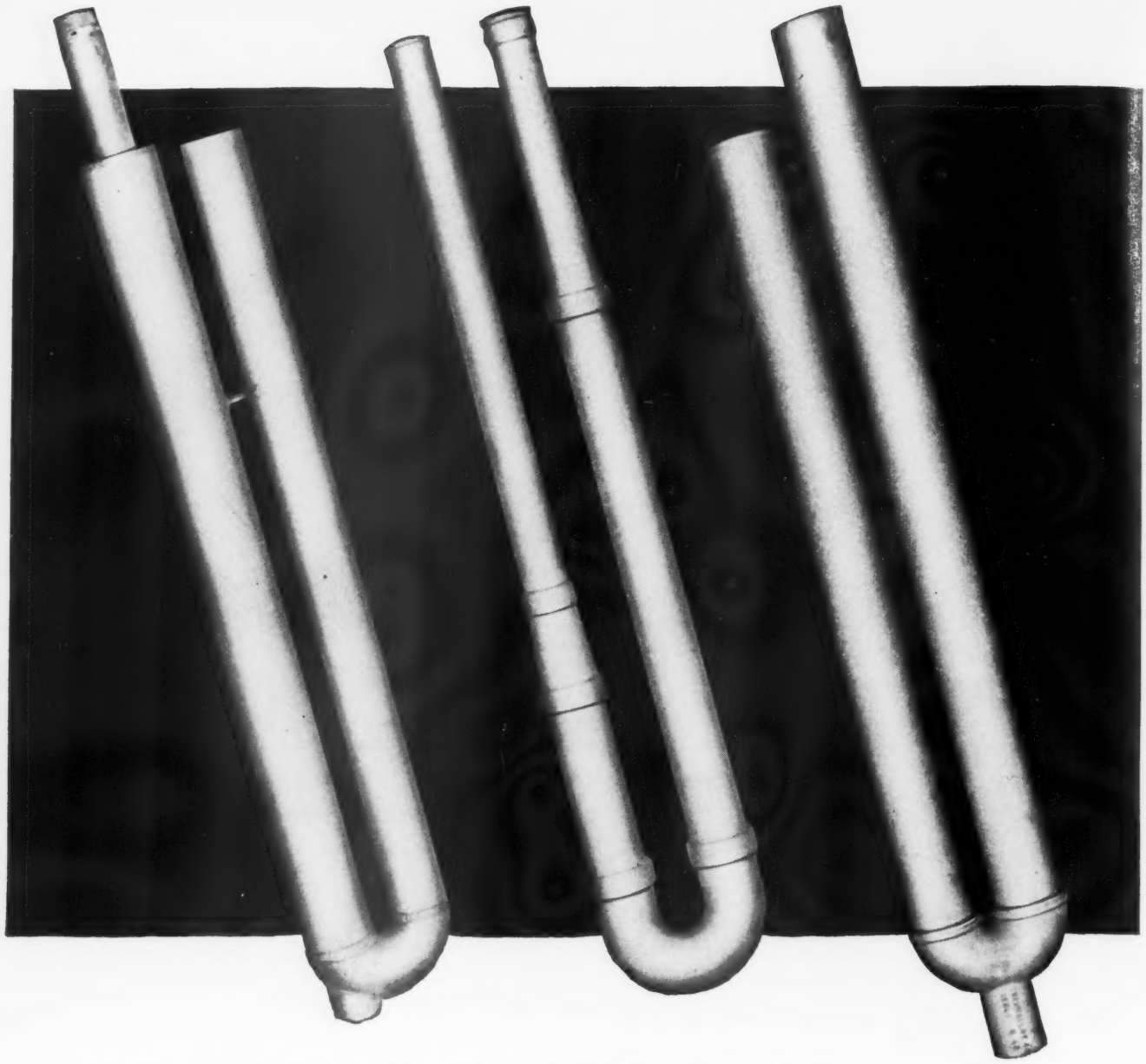
"Further," says Baysinger, "we estimate *our scrap loss has been cut 20% since switching to Edco.*" Benefits like these are typical. For example, another Edco user commented, "Our old wood boards had a life of about two weeks; and toward the end of their life-span, they always produced some poor castings which had to be rejected." Edco Dowmetal Bottom Boards are different: they stand up under constant use . . . and keep casting quality up, too.

Add to this the fact they are light, easy to handle—stack in small space, easily and securely—and you'll see why it's "good business" to switch to Edco.

Write us, or phone CApitol 7-2060 for price schedule and list of 78 standard sizes available from stock.

CHRISTIANSEN CORPORATION

210 SOUTH MARION ST.
OAK PARK 1, ILLINOIS
ALUMINUM ALLOY INGOTS



GET MORE HOURS OF SERVICE FROM

Thermalloy* radiant tubes

Make Electro-Alloys your source if you want radiant tube assemblies that will give more life and reduce maintenance costs.

All components are produced in suitable analyses under close metallurgical supervision, and with X-ray control. The straight tube sections are centrifugally cast in such a way that wall thickness is uniform throughout; i. e., inside diameter and outside diameter are concentric, and thickness is the same the full length of the tube. All finished assemblies are pressure-tested before shipment to insure freedom from leakage. As a result, you are assured of radiant tube assemblies that last longer without cracking, warping or sagging.

Whatever your needs in radiant tube assemblies or other heat-treating equipment—you'll get more operating economy from high heat-resistant Thermalloy castings. Let us know your requirements. Call your nearest Electro-Alloys engineer or write Electro-Alloys Division, 5008 Taylor Street, Elyria, Ohio.

AMERICAN Brake Shoe COMPANY

ELECTRO-ALLOYS DIVISION

ELYRIA, OHIO

*Reg. U. S. Pat. Off

Every foundryman and casting buyer should have a copy of this

new

SHELL MOLDING MANUAL

Just off the press! An up-to-the-minute, fully illustrated "here's-what's-new" manual on SHELL MOLDING—*yours* for the asking! This 28-page brochure dramatically tells, with BIG pictures and informative text, about the latest developments in shell molding and the benefits it offers to the foundryman and his customer.

New techniques—big benefits. You'll read how this new casting process has made possible astonishing reductions in machining and finishing costs . . . how it has resulted in drastic cuts in foundry casting time. There are tips on new materials and equipment—the latest data on the resins and machinery that make the shell process so rewarding to those who make and buy castings.

Published by General Electric. G.E., a major supplier of resins and silicone release agents for the shell-molding process, has spared no pains to make this manual informative, readable, *timely*. It's "must" reading—right now—for every foundryman and casting buyer! The coupon will bring *you* a copy—promptly!

A limited number of 35-mm. sound-slide films, "Shell Molding and You," are also available on a loan basis. Request on company letterhead, stating preferred date.

SEND FOR YOUR FREE COPY TODAY!

General Electric Company
Section 418-3A, Chemical Division
Pittsfield, Massachusetts

Please send me a free copy of *G-E Shell Molding Manual.*
( ) We are presently using the shell-molding process.
( ) We are interested in the shell-molding process.

Name_____

Firm_____

Street_____

City_____ Zone___ State_____

Progress is our most important product

GENERAL ELECTRIC

Abundant Supplies of aluminum

For foundries and independent fabricators

BECAUSE of the rapidly expanding capacity of the aluminum industry—led by Kaiser Aluminum—you can be sure of adequate supplies of pig, ingot and billet, now and in the future.

Now, as before, our business is serving manufacturers—rather than manufacturing our own end products. As a result, Kaiser Aluminum, of all domestic aluminum producers, provides the highest amount of primary aluminum for the use of foundries and independent fabricators.

We'll be glad to work with you on your fabricating problems. Contact the Kaiser Aluminum office listed in your telephone directory. Kaiser Aluminum & Chemical Sales, Inc., *General Sales Office:* Palmolive Bldg., Chicago, Illinois; *Executive Office:* Kaiser Bldg., 1924 Broadway, Oakland 12, California.

Here's why independent fabricators rely on Kaiser Aluminum!

Faster service and delivery on orders from our conveniently located plants at Newark, Ohio; Chalmette, Louisiana; Halethorpe, Maryland; Mead and Tacoma, Washington.

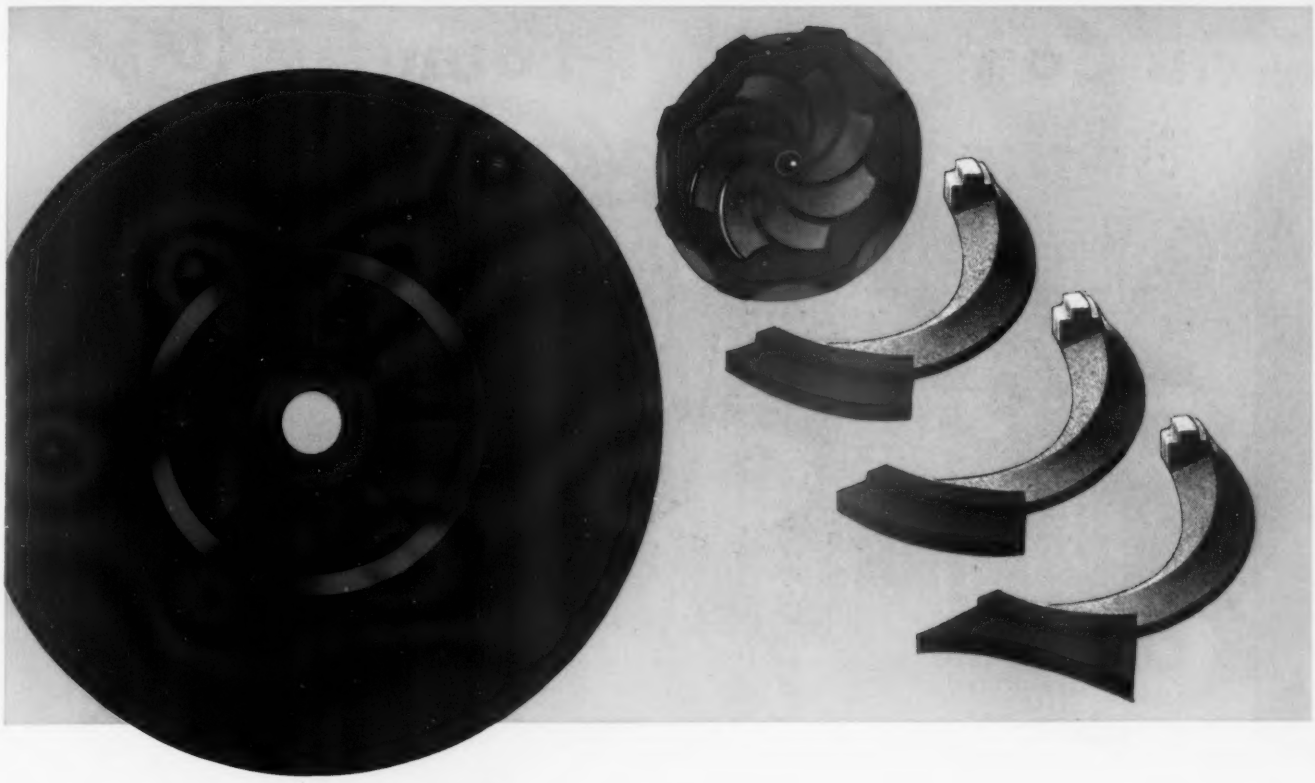
Dependable source of supply because we are an integrated producer.

Outstanding engineering service, including design assistance and other technical advice.

Our ability to produce to all standard specifications or to all special customer specifications.

Kaiser Aluminum

The nation's largest supplier of aluminum pig, ingot and billet



FOR SMOOTHER CORES

KORGLAZE

. . . FINER CASTINGS

AN AIR DRYING WASH FOR CORES & MOLDS

Here are some things which **KORGLAZE** *does that make it a must for finer castings:*

- **Applied to the mold it will produce a clean, smooth outer surface on castings.**
- **Applied to the cores it leaves the inner surface with a fine texture and true dimensions.**
- **Applied to shell molds it preserves the silvery sheen on aluminum and magnesium castings.**

All these points can rate as eye appeal but the appeal to the Cost Department is the real money it saves in the cleaning room and in machining. KORGLAZE pays its own way. Cost is lost in handsome savings — the bankable kind which show up on the balance sheet.

Our KORGLAZE folder tells all about this fine work. You can only imagine the results until you have a chance to try it yourself and it's worth that try.

The business end of a fire pump where a fine as-cast surface really rates.

UNITED OIL MFG. COMPANY

1128 WALNUT STREET ERIE, PA.

You Can Cut Your Foundry Costs in the *Birmingham* District

Center of the Growing Southern Market

Foundry Productive Capacity
10 Leading Market Areas

Principal City	Annual Capacity Net Tons
Detroit	2,419,332
Chicago	2,094,648
BIRMINGHAM	1,935,336
Pittsburgh	1,899,804
Cleveland	1,670,196
Indianapolis	1,173,360
Milwaukee	1,067,820
Los Angeles	870,588
South Bend	541,440
Buffalo	498,084

Source: FOUNDRY — August, 1953

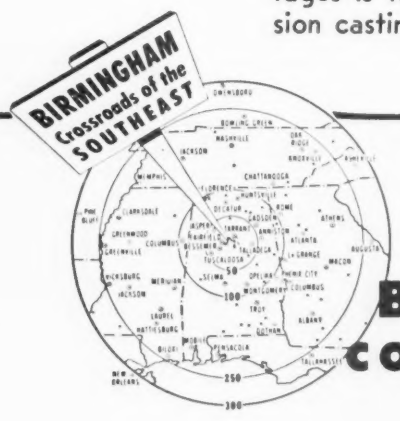
Increasing competition in practically every field is necessitating re-examination of production costs.

In the central Birmingham district—America's Number 3 market area in foundry capacity—there is an outstanding present opportunity for large and small foundries making all kinds of castings to cut costs and build sales volume.

HERE FOUNDRIES WILL FIND:

- ✓ **High and low phosphorus pig iron.**
- ✓ **Abundant supply of world's finest foundry coke.**
- ✓ **Natural and by-product gas and cheap electricity.**
- ✓ **Good moulding sand.**
- ✓ **Skilled, co-operative, native-born workers — many from families who have worked in foundries for two or even three generations.**
- ✓ **Fast growing Southern markets, where many millions are being invested in new plants.**
- ✓ **Superior transportation facilities — rail, truck and water — and favorable freight rates.**

This unusual combination of manufacturing and distributing advantages is the major reason why foundries making rough and precision castings are prospering in Birmingham.



Write this Committee or any of its undersigned members for detailed data on how to cut your foundry costs in this central district of the South.

BIRMINGHAM
COMMITTEE OF 100
1914 Sixth Ave., N., Birmingham, Ala.

Executive Committee

Gordon Persons
Governor of Alabama

John S. Coleman
President
Birmingham Trust
National Bank

Donald Comer
Chairman Exec. Comm.
Avondale Mills

R. Hugh Daniel
President
Daniel Construction Co.

William P. Engel
Engel Companies

W. W. French, Jr.
President
Moore-Handley Hdw. Co.

Meryl H. Geisking
Assistant to President
Tenn. Coal & Iron Div.
United States Steel Co.

Joseph N. Greene
Chairman, Alabama Gas Corp.

Clarence B. Hanson, Jr.
Publisher
The Birmingham News

H. Neely Henry
Vice President
Alabama Power Co.

Claude S. Lawson
President
U. S. Pipe & Foundry Co.

Thomas W. Martin
Chairman of the Board
Alabama Power Co.

J. C. Persons
Chairman of the Board
First National Bank

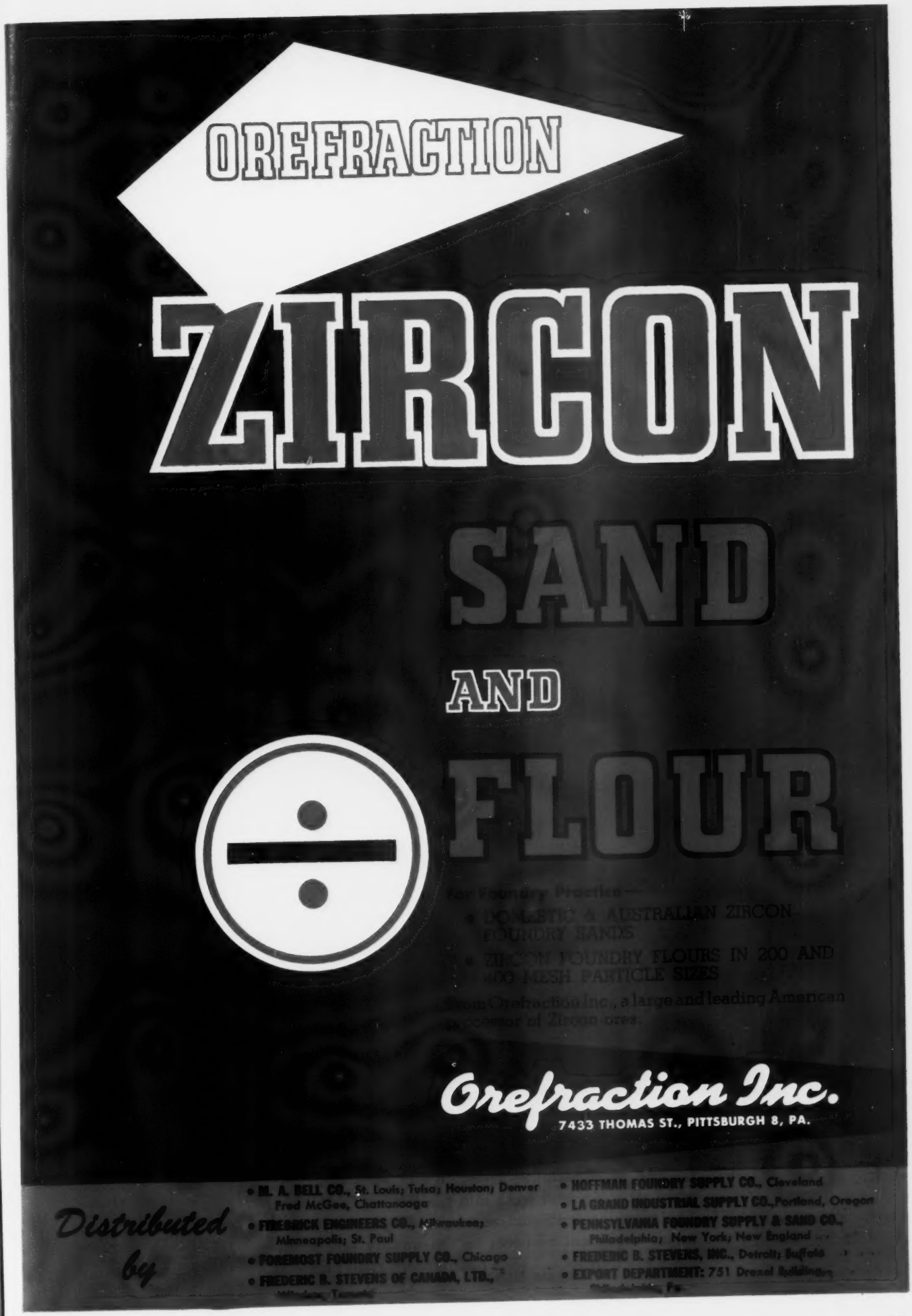
Isadore Pizitz
President, Pizitz

O. W. Schanbacher
President
Loveman's

Mervyn H. Sterne
Sterne, Agee & Leach

John E. Urquhart
President
Woodward Iron Co.

A. V. Wiebel
President
Tenn. Coal & Iron Div.
United States Steel Co.

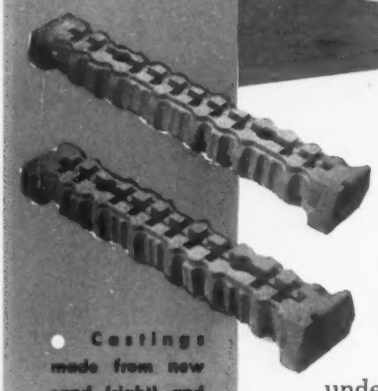

OREFRACTION
ZIRCON
SAND
AND
FLOUR
for Foundry Practice—
• DOMESTIC & AUSTRALIAN ZIRCON FOUNDRY SANDS
• ZIRCON FOUNDRY FLOURS IN 200 AND 400 MESH PARTICLE SIZES
from Orefraction Inc., a large and leading American
processor of Zircon ores.
Orefraction Inc.
7433 THOMAS ST., PITTSBURGH 8, PA.
Distributed by
• M. A. BELL CO., St. Louis; Tulsa; Houston; Denver
Fred McGee, Chattanooga
• FIREBRICK ENGINEERS CO., Milwaukee; Minneapolis; St. Paul
• FOREMOST FOUNDRY SUPPLY CO., Chicago
• FREDERIC B. STEVENS OF CANADA, LTD.,
• HOFFMAN FOUNDRY SUPPLY CO., Cleveland
• LA GRAND INDUSTRIAL SUPPLY CO., Portland, Oregon
• PENNSYLVANIA FOUNDRY SUPPLY & SAND CO.,
Philadelphia; New York; New England
• FREDERIC B. STEVENS, INC., Detroit; Buffalo
• EXPORT DEPARTMENT: 751 Drexel Building

DEMONSTRATED:

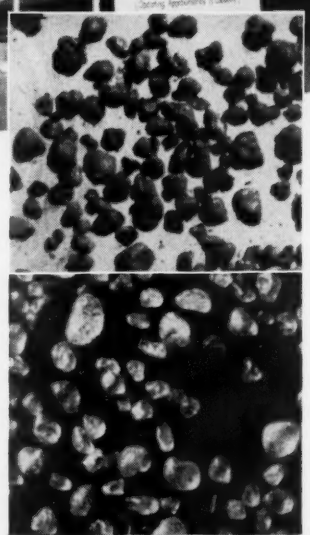
AT THE FOUNDRY SHOW:

Used Core Sand and Spent Molding Sand . . . RECLAIMED

Here, within the limited confines of an exhibit booth, world foundrymen were given a *production equipment* demonstration of the practicability . . . the real economies of *pneumatic* sand reclamation. Here, waste sand—sand that under normal conditions would be relegated to the dump—was reclaimed, prepared in the new No. 1F Simpson Mix-Muller, and returned to the foundry for use in automotive cores. *Waste* core sand and *spent* molding sand went into the National Scrubber. The resulting sand was, as reported by users, "equal in all important respects to the quality and workability of new sand." (See photographs right and left)

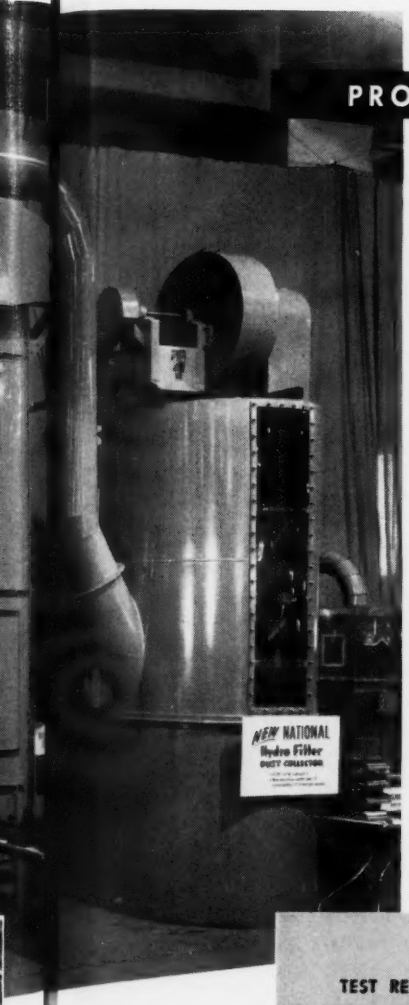


● Castings made from new sand (right) and sand reclaimed by National Scrubber (left). Tests indicate the reclaimed sand core is as good as the new sand core, for all production purposes.



● Photomicrographs of sand before (above) and after reclamation (below) show the difference in National pneumatically scrubbed sand. (Name of foundry on request)

THE MEANS FOR PRACTICAL SAND RECOVERY



PROVED IN USE:

One year's operation—another unit ordered at Locomotive Finished Material Company

Typical of the continuing confidence being evidenced by users of the National Pneumatic Scrubber is the experience of Locomotive Finished Material Company. This Atchison, Kansas, firm is now installing a *second* unit after one year of continuous service with the first Scrubber. Mr. C. E. Akers, Plant Engineer, *tells why* in reporting on a series of 5 tests conducted on new sand versus reclaimed sand:

"You will note that the bonding material additions, including core oil, are exactly the same in both cases. The A.F.S. grain size, clay content, and fines on the reclaimed sand—and the properties of the core sand made from it, are so close to the comparable figures on new sand that we feel the reclaimed sand is just as good as the new sand for all practical purposes . . . We have noticed no difference in casting surfaces between the two."

"The figures given for the reclaimed sand are for an operating rate of 1.4 tons per hour out-put and a recovery of approximately 80%."

Simple in theory and operation, compact and rugged in design, economical in use, the National Sand Recovery System is daily proving profitable and demonstrating that practical sand recovery is within the operating and financial means of foundries. Reports of savings demonstrated in leading foundries all over the country are as close as your National engineer. Call him or write for *Bulletin 512.*

LOCOMOTIVE FINISHED MATERIALS COMPANY
TEST RESULTS: AVERAGE OF 5 TESTS ON NEW & RECLAIMED SAND

SCREEN SIZE	NEW SAND	RECLAIMED
20	.1	.3
30	2.4	1.3
40	21.6	18.4
50	28.9	28.6
70	22.7	26.6
100	18.0	19.9
140	4.2	3.1
200	1.0	.4
270	.3	.0
PAN	.0	.0
TOTAL	99.2	98.6
AFA#	48.9	48.5
CLAY	0.8	0.9

OIL SAND ADDITIONS	NEW SAND	RECLAIMED
Sand	800#	800#
Wood Flour	17#	17#
Corn Flour	17#	17#
Core Oil	3 Qts.	3 Qts.
Conditioning Oil	1 Qt.	1 Qt.
SAND PROPERTIES	**NEW SAND**	**RECLAIMED**
Moisture	5.8	5.9
Green Strength	3.3	2.8
Permeability	54	65
Dry	175	173
Tensile		

• Write for Bulletin 512, or have your National engineer show you facts and figures on savings realized with the National Scrubber Unit.

National Engineering Company
(Not Inc.)
646 Machinery Hall Bldg. • Chicago 6, Illinois

NATIONAL SAND PREPARING & MOLD HANDLING SYSTEMS

SIMPSON *Intensive* MIX-MULLERS

DELTA Core and Mold Washes

for

Closer Tolerance..
Better-Finish Castings

•

... Lower Cleaning
Room Costs.....

•

... Less Scrap...

•

•

IMPORTANT REASONS WHY MORE FOUNDRIES USE DELTA CORE AND MOLD WASHES TO SPEED PRODUCTION AND REDUCE COSTS

DELTA CORE AND MOLD WASHES *"Anchor" themselves by penetrating from 4 to 7 grains deep into the sand.* This bond between the wash and the sand . . . an exclusive DELTA feature . . . produces an expansion-resisting coating essential to the production of finer finished castings.

The dry compression strength increases with each degree rise in temperature up to 500° F when the hot compression strength takes over. *The hot compression strength* increases with each degree of temperature rise up to 2900° F. The ultimate hot compression strength of the wash is over 1000 p.s.i.

There is no gas leakage through Delta Core and Mold washed surfaces. Gases produced by decomposition of organic binders in the core sand cannot leak through Delta Core and Mold washed surfaces to contact the molten metal. Only DELTA CORE AND MOLD WASHES provide this unique and all-important insurance against defective castings resulting from gas leakage.

DELTA

There is a DELTA Wash for every type of Metal Casting.

Working samples and complete literature on Delta Foundry Products will be sent to you on request for test purposes in your own foundry.

DELTA OIL PRODUCTS CO.

MANUFACTURERS OF SCIENTIFICALLY CONTROLLED FOUNDRY PRODUCTS

MILWAUKEE 9, WISCONSIN

Power-Packed for Profit...

SHOT OR GRIT . . . that's Malleabrasive. Malleabrasive is scientifically heat-treated and laboratory controlled to clean *better, faster,* and last *longer*. Malleabrasive cleans *cheap*... because you save on parts repair and down-time . . . because its long life cuts abrasive purchases. Don't take our word for it. Prove it to yourself. Next time you buy blast cleaning abrasive, specify Malleabrasive from Pangborn Corporation, 1400 Pangborn Blvd., Hagerstown, Md.

Look to Pangborn for the right abrasive for every blast cleaning job.

Pangborn DISTRIBUTORS FOR **MALLEABRASIVE®**

U. S. Patent #2184926
(other patents pending)

Pangborn BLAST CLEANS CHEAPER
with the right equipment for every job

Aluminized Asbestos Clothing

1481RA SPRING TYPE LEGGING

Considered the best type legging by many because no adjustments are necessary. Easily put on, quickly removed. Spring steel frame not only protects leg from impact but creates air space between leg and legging. Has chrome-tanned leather flare with spring clip.

1481RAR RENEWABLE TYPE SPRING LEGGING

Regular spring type legging except parts are replaceable. Covering can be removed and replaced because it is attached to frame by snap fasteners. Either frame or covering can be ordered separately, thus lowering costs.

These **NEW ALUMINIZED ASBESTOS LEGGINGS**

Reflect 90% of the Radiant Heat!

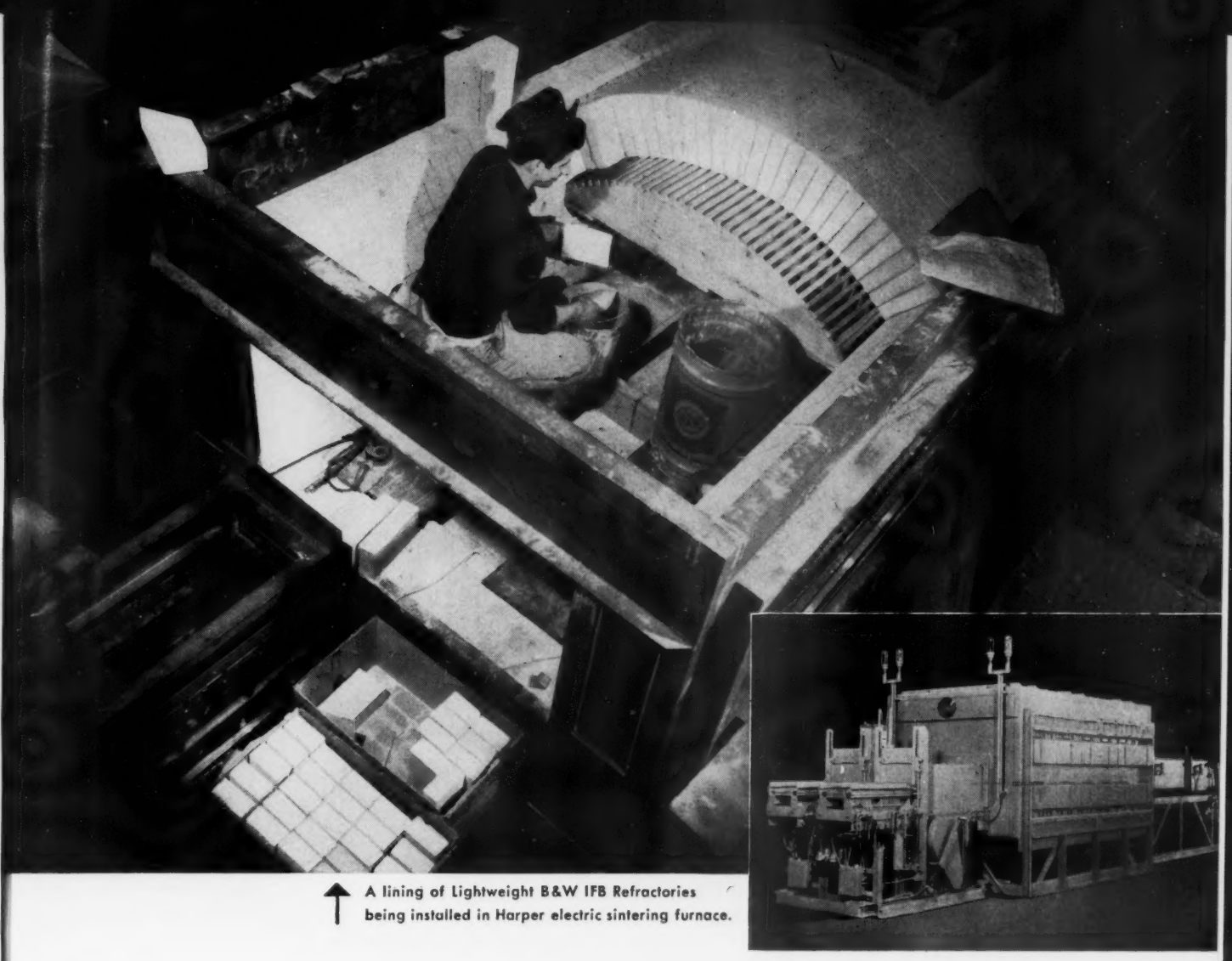
Here are two new AO products that keep your workers' legs *cool and comfortable!* They are part of AO's new complete line of aluminized asbestos clothing: leggings, spats, mittens, gloves, coats, jackets, sleeves, pants, overalls, coveralls, aprons and hoods.* AO Aluminized Asbestos products combine the heat resistance of asbestos with the reflective qualities of aluminum . . . with only 50% the weight of regular asbestos. Your nearest AO Safety Products Representative can supply you.

**Also available in Aluminized Duck except gloves, mittens, jackets, split leg aprons.*

American Optical
SAFETY PRODUCTS DIVISION

Keep your workers in the Safety Zone with American Optical Safety Equipment.

SOUTHBRIDGE, MASSACHUSETTS • BRANCHES IN PRINCIPAL CITIES



A lining of Lightweight B&W IFB Refractories being installed in Harper electric sintering furnace.

Refractories Maintenance Cut Down

ON HARPER ELECTRIC FURNACES AND KILNS

"Furnace linings that don't last as long as they should can shoot our customers' production costs 'sky high' —and take a big bite out of their profits."

That's one of the reasons why Harper Electric Furnace Corporation standardized on B&W Insulating Firebrick for the electric kilns and furnaces which they manufacture. They know from experience that "B&W IFB last longer than any insulating firebrick we ever tried."

The reason? Volume stable raw materials, unique quality control and manufacturing processes, including B&W's exclusive double burning at temperatures well above use limits—all these factors contribute to more uniform brick and longer life.

B&W IFB, the lightest weight insulating firebrick, also offer these advantages:

Cut electricity or fuel costs— Lighter in weight than any other insulating firebrick, B&W IFB store and conduct less heat. This means faster heating up time, less heat loss during furnace operation. Results? Lower electricity or fuel consumption —often 30% to 50% less than with ordinary heavy firebrick.

Cut installation costs — Hand fitting is easy and fast—B&W IFB can be cut, drilled or shaped on the job with ordinary hand woodworking tools.

Cut down-time — B&W IFB cool off quicker because they store less heat —make possible quick access to the furnace for inspection. Furnace gets back on the line faster, too, because B&W IFB heat up quickly.

These savings explain why B&W Insulating Firebrick are being used in thousands of applications . . . from the largest industrial furnaces to the smallest kilns. Contact your local B&W Refractories Engineer. He may point the way to new savings in your furnace.

BABCOCK & WILCOX

THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
GENERAL OFFICES: 161 EAST 42nd ST., NEW YORK 17, N.Y.
WORKS: AUGUSTA, GA.

B&W REFRACTORIES PRODUCTS — B&W Allmul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick • B&W Refractory Castables, Plastics and Mortars

R 494

Latest type Cooper-Bessemer 1500 hp opposed-action air compressor, installed in Boeing's Research Laboratory, Seattle. Capacity is automatically, accurately controlled at any discharge pressure up to 295 psig.

Modern air power on land

HELPS GAIN NEW POWER IN THE SKY!

HERE are two kinds of air power—Boeing's amazing new B-47 Stratojet, shown in a Jato takeoff, and a modern Cooper-Bessemer motor-driven air compressor. Installed in Boeing's Research Laboratory almost a year ago, this big compressor supplied air under pressure for testing many of the B-47 parts, will go on year after year contributing to Boeing's broad development program.

The latest Cooper-Bessemer compressor developments offer new advantages, new economies to plants everywhere . . . wherever air is a tool. For example, modern opposed-action design means greater space-saving compactness, vibration-free operation, higher efficiency, and longer life with less maintenance.

So when it comes to air or power, it will pay you to write for the latest Cooper-Bessemer bulletins. Find out about the *new* things being done by one of America's *oldest* builders of engines and compressors.

The Cooper-Bessemer Corporation

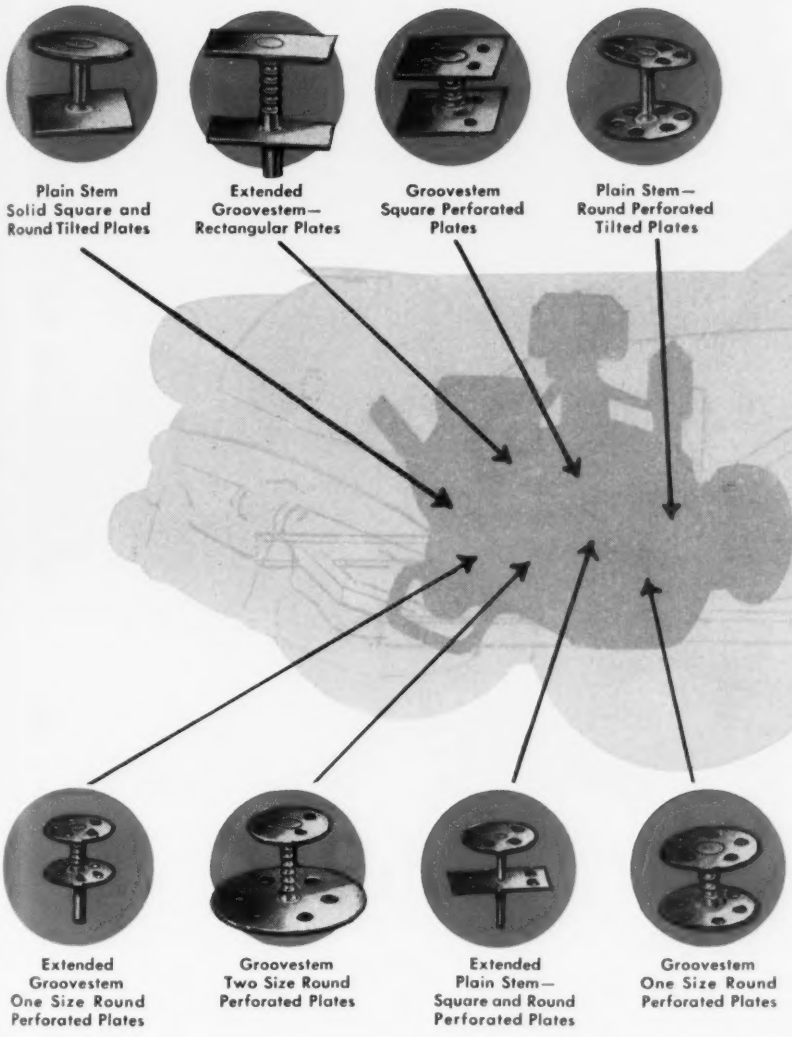
MOUNT VERNON, OHIO — GROVE CITY, PA.

New York • Chicago • Washington • San Francisco • Los Angeles • San Diego • Houston • Dallas • Odessa • Pampa • Greggton • Seattle • Tulsa • St. Louis • Gloucester • New Orleans • Shreveport
Cooper-Bessemer of Canada, Ltd., Halifax, N. S.

DIESELS • GAS ENGINES • GAS-DIESELS • ENGINE-DRIVEN AND MOTOR-DRIVEN COMPRESSORS • HIGH PRESSURE LIQUID PUMPS

fine FANNER motor CHAPLETS

are used by more automotive manufacturers... in more locations... because of their outstanding record for producing sound, uniform castings



Products that are used by automobile manufacturers must pass the most rigid of tests. This is especially true of products involved in the casting operation because this industry depends on a gigantic continuous flow of uniform sound castings which form the heart of every motor car. Here, there can be no compromise with quality because unsound castings mean product failure and production line breakdowns. It is significant that for the past 30 years more fine Fanner Motor Chaplets have been used by more automotive manufacturers for more different castings than all other types combined. The millions upon millions of fine Fanner Motor Chaplets that have become an integral part of almost every motor car manufactured in the United States are proof of the close precision tolerances maintained, and the uniform high quality of these Fanner products. Fine Fanner Motor Chaplets through their exclusive design, their positive core support, their accuracy of construction, their complete fusion help produce better castings...at lower costs...with fewer losses...yet they cost no more! Only a few of the wide range of Motor Chaplets made by Fanner are shown —get acquainted with the complete line of Fine Fanner Chaplets by writing today for your free copy of the Fanner Chaplet Catalog.

THE FANNER MANUFACTURING COMPANY

designers and manufacturers of fine FANNER CHAPLETS AND CHILLS

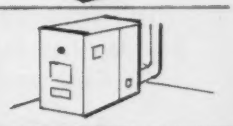
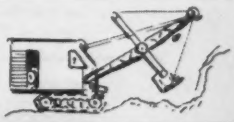
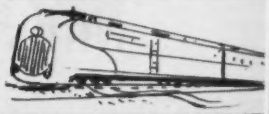
BROOKSIDE PARK **CLEVELAND 9, OHIO**

there are

fine **FANNER**

MOTOR CHAPLETS

for many other products

pumps	
stoves	
furnaces	
road machinery	
locomotives	
farm machinery	

"We're melting everything under the sun with our Lectromelt* Furnace."

says:

M. C. Stephens, Jr., Melting Supervisor
Ross-Meehan Foundries
Chattanooga, Tenn.

This size P. T. furnace rated at 3½ tons per hour is the larger of two Lectromelts which are contributing to the versatility of Ross-Meehan Foundries' operation.

"We're a job foundry.
It's good business to be so versatile."

"... Out of 11 heats turned out in 17 hours of one day, eight were of different alloys. Every day we produce three to five different metals as standard procedure, including Ni-Resist, 28 chrome and Meehanite. And the ease of making a special heat of steel in a Lectromelt* Furnace helps us a lot. It seems that everything about a Lectromelt is just right for our production."

This production man is talking about his foundry job. He has seen the value of precise control of temperature and analysis made possible with a Lectromelt Furnace. The flexibility of production, the versatile nature of a Lectromelt and the matter of casting special heats and special alloys daily ... these could make your foundry more efficient and capable—could let you go after more profitable castings business.

Write for Lectromelt Furnace Bulletin No. 9. Request any engineering information you require. Pittsburgh Lectromelt Furnace Corporation, 314 32nd Street, Pittsburgh 30, Pennsylvania.

Manufactured in... GERMANY: Friedrich Kocks GMBH, Dusseldorf... ENGLAND: Birlec, Ltd., Birmingham ... FRANCE: Stein et Roubaix, Paris... BELGIUM: S. A. Belge Stein et Roubaix, Bressoux-Liege ... SPAIN: General Electrica Espanola, Bilbao ... ITALY: Forni Stein, Genoa. JAPAN: Daido Steel Co., Ltd., Nagoya

*REG. T. M. U. S. PAT. OFF.

MOORE RAPID

WHEN YOU MELT... *Lectromelt*

NEW BAKER "Yardloader"
TRADE-MARK

4000 LB. GAS FORK TRUCK COSTS ONLY $2985.00

Priced about 25% under any other gas trucks in its capacity, the Yardloader now brings cost-saving fork truck operation within the reach of practically every company with yard-handling problems. Travel speed approaching 14 miles per hour, large pneumatic tires, exceptionally high ground clearance and oscillating trail axle make it the ideal truck for outdoor service over large unimproved or semi-improved areas.

Heavy-duty industrial engine of proven make, 4-speed transmission and extra-heavy drive axle assure ample power for top performance under any conditions. Hydraulic lift to 122 inches, automotive-type steer, convenient controls and excellent driver visibility are a few of the features contributing to safety and ease of operation.

Get all the facts—and save up to $1000.00 on your next gas fork truck.

Send in this coupon today.

THE BAKER-RAULANG COMPANY

1223 West 80th Street • Cleveland 2, Ohio

The Baker-Lull Corporation • Subsidiary, Minneapolis, Minn.
Materials Handling and Construction Equipment

TO THE BAKER-RAULANG CO., 1223 West 80th St., Cleveland 2, Ohio

Please send me information and specifications on the new Baker EY-40 Yardloader which sells for only $2985.00.

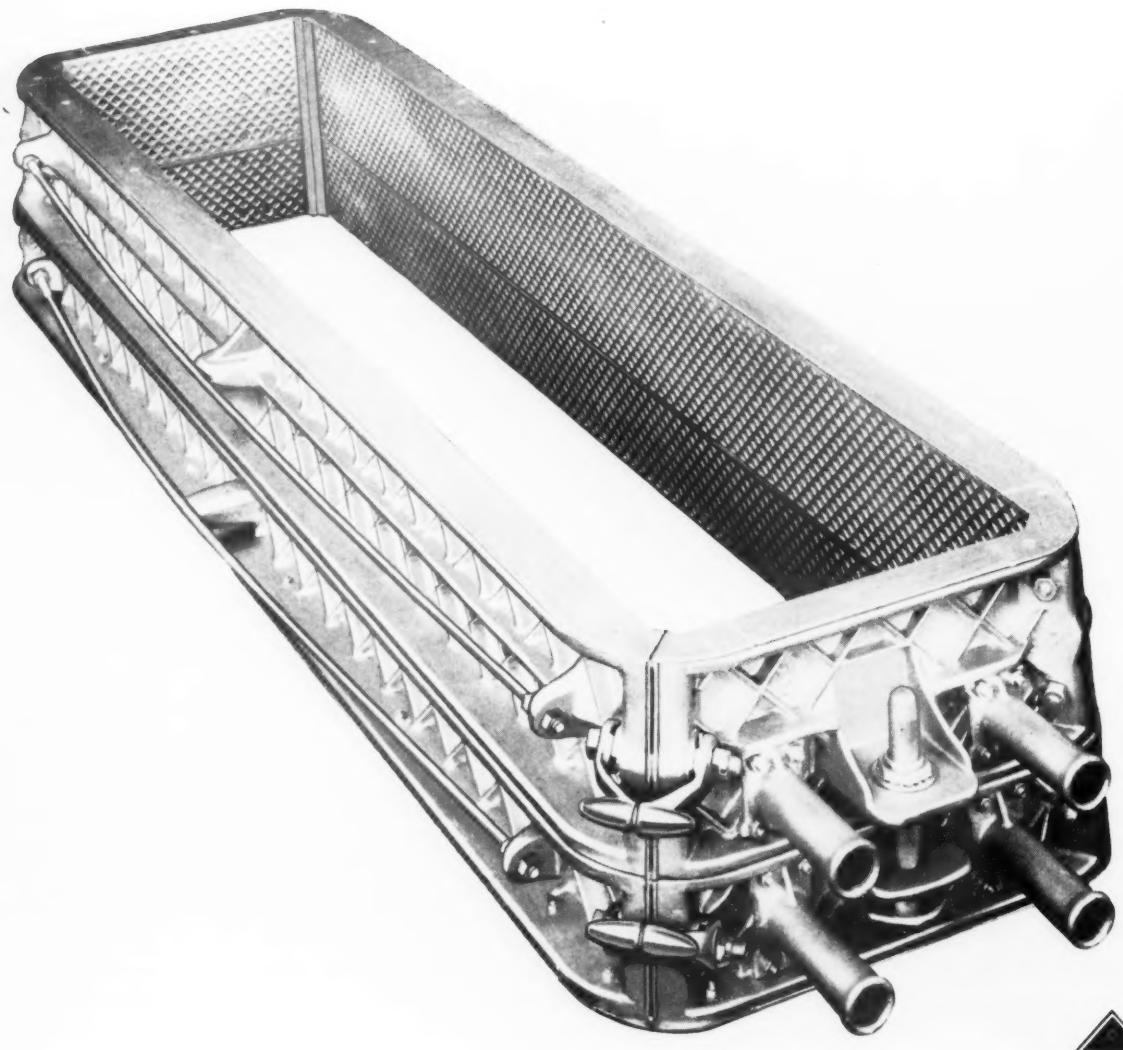
*Name*_____ *Title*_____

*Company*_____

*Address*_____

*City*_____ *State*_____

never



Heavy duty, HINES aluminum "Pop-Off" flask for use under sand slingers. Eliminates shake-out problems and reduces flask maintenance. Can be equipped with trunnions for handling by hoist.

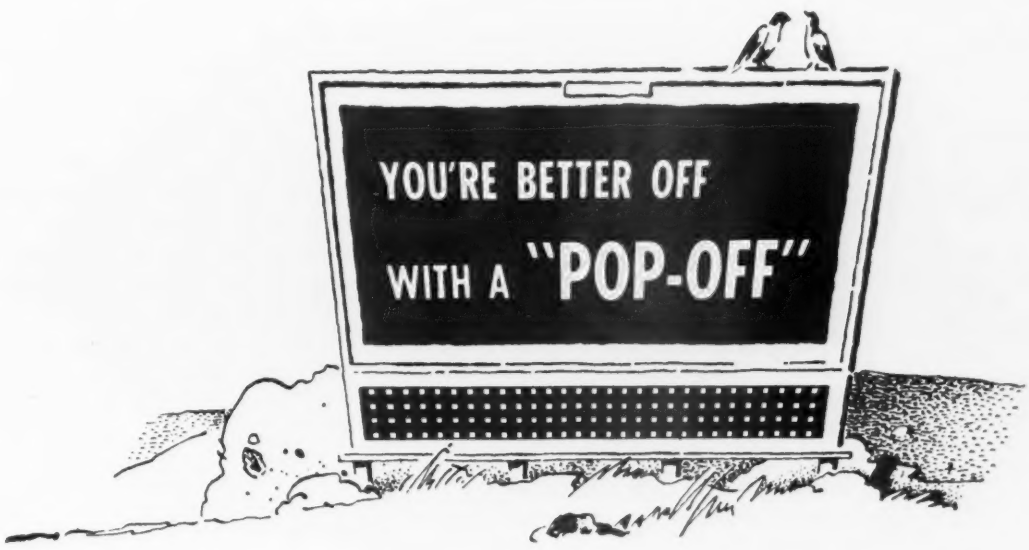
HINES POP-OFF FLASK

MEMBER FEMA

THE H

a doubt

If you want a flask that opens easily—really pops-off without hammering . . . . a flask with fewer parts and no adjustments . . . . a flask that will last longer and produce better molds, with a minimum of scrap loss—then, there's never a doubt . . . .

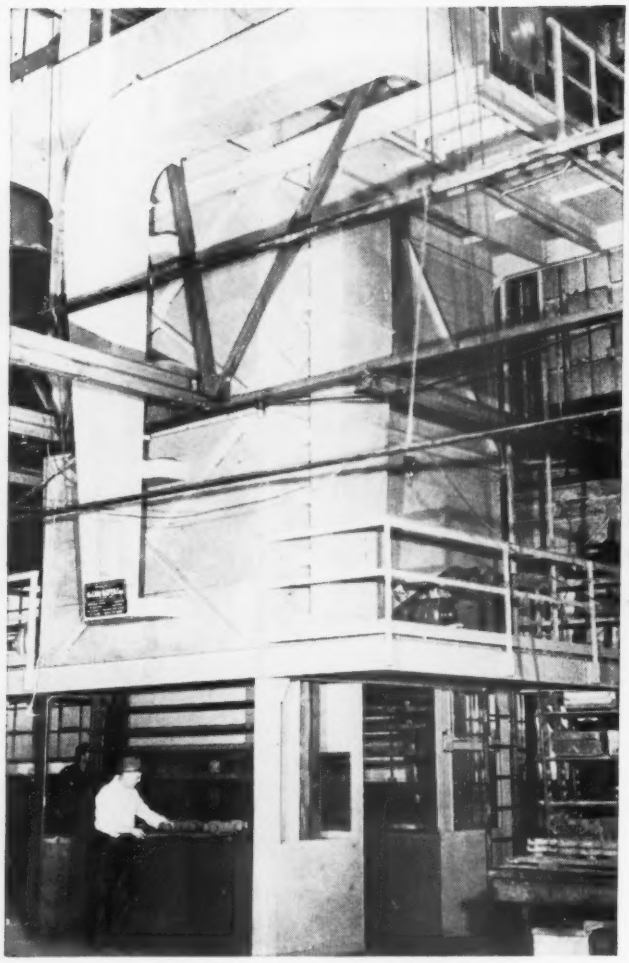


E HINES FLASK CO.

3431 WEST 140TH STREET • CLEVELAND 11, OHIO • PHONE ORCHARD 1-2806

CARL-MAYER

Important Development in VERTICAL CORE OVENS



HEAT FAN INSIDE OF OVEN ←

Recent installation of Carl-Mayer Vertical Core Oven with combination gas and oil fired recirculating heating system, at G. & C. Foundry Co., Sandusky, Ohio.

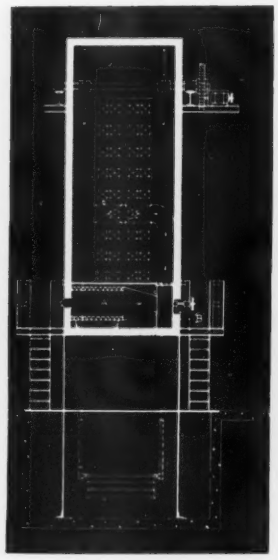


Fig. 1
NEW METHOD with heat fan inside oven. Patent No. 2,628,087.

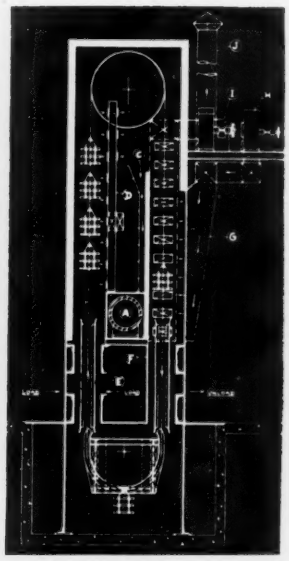


Fig. 2
Section showing conveyor travel thru pass, heating, cooling and exhaust system.

Vertical Ovens (Figs. 1 and 2) are by Carl-Mayer, using the universally adopted recirculating heating system with sealed combustion chamber located between the conveyor chains (Patent No. 2,257,180) and new method heat fan inside of oven (Patent No. 2,628,087).

EXCLUSIVE HEATING SYSTEM *pays off several ways!*

- Saves platform space.
- Eliminates external heat duct, reducing heat losses.
- Placing heat fan *in* oven also reduces heat losses, resulting in high operating efficiency.
- By eliminating external heat duct and fan insulation, it reduces installation cost.
- There is no smoke as from external heat ducts.
- Oven appearance is greatly improved.

Other important features contribute to faster baking, lower fuel consumption, smaller core losses, safer operation, elimination of smoke, cooled cores at unloading position and reduced labor cost.

A few of our Vertical Oven Customers:

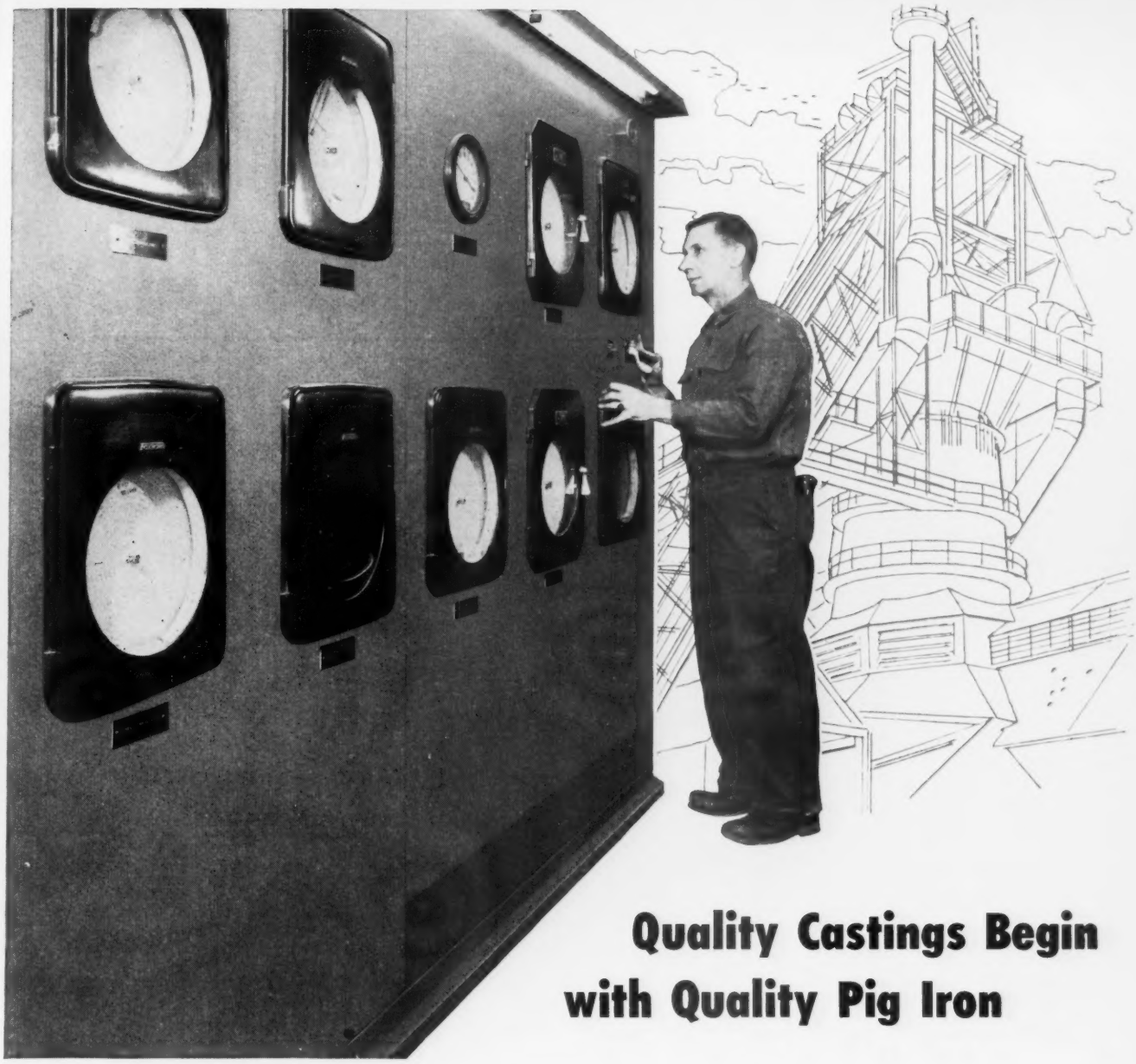
Aluminum Co. of America
Ashland Malleable Iron Co.
Buick Motor Div. of General Motors Corp.
Cadillac Motor Div. of General Motors Corp.
Chevrolet Motor Div. of General Motors Corp.
Electric Autolite Co.
Ford Motor Co.
Fremont Foundry Co.
G. & C. Foundry Co.
General Steel Castings Co.
Ingersoll Steel & Disc Div. Borg-Warner Corp.
Richmond Radiator Co.
H. B. Salter Co.
Union Brass & Metal Mfg. Co.
West Michigan Steel Castings Co.
A. C. Williams Co.

Write for Bulletins No. 53-CM and HT-53

THE CARL-MAYER CORPORATION

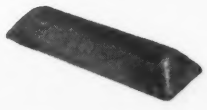
3030 Euclid Avenue • Cleveland, Ohio

BACKED BY REPUTATION AND OVER 30 YEARS' EXPERIENCE



Quality Castings Begin with Quality Pig Iron

THE quality of your gray iron castings depends on pig iron produced under controlled conditions. That's why we take special care in the production of Neville Pig Iron, day in and day out, year in and year out. Modern controls like those above, for example, enable us to maintain furnace temperatures and pressures within a cat's whisker of perfection. When you specify Neville Pig Iron, you're sure of uniform, close grain and the precise analysis you need. ● Why not let Neville Quality work on *your* side, just as dozens of well-known foundries do. We'll be glad to discuss your specific problems and requirements.



Neville **Pig Iron and** Neville **Coke for the Foundry Trade**

PIG IRON DIVISION

PITTSBURGH COKE & CHEMICAL CO.

Grant Building • Pittsburgh 19, Pa.

W&D 5242

COAL CHEMICALS • AGRICULTURAL CHEMICALS • FINE CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON

DETROIT ELECTRIC FURNACES

Keep the Pouring Crew Busy ...and the Boss Happy!

Four Detroit ROCKING Electric Furnaces melt brass with speed and economy at Sterling Faucet Company

To keep pace with increased production schedules in the post-war boom, Sterling Faucet Company installed four 500-lb. Detroit Electric Furnaces in their Morgantown, West Virginia plant. These versatile furnaces provide fast, controlled-quality melting in the production of brass plumbing goods and fixtures. And they operate at better than average economy over flexible production runs.

Detroit furnaces use indirect arc heat for fast, efficient melting. This permits a wide temperature range for melting both ferrous and nonferrous metals. Electrodes always remain clear of the bath, minimizing carbon pickup and alloy variation.

The constant rocking action of the shell washes metal over more of the refractory surface for greater heat utilization. This also promotes longer lining life and insures a homogeneous mixture when alloying metals. With precise power regulation and automatic control, the most efficient melting cycle can be duplicated, for more uniform results at lower cost.

Other Detroit features include automatic electrode control, easy shell interchange, choice of conical or cylindrical shells, longer trouble-free service.

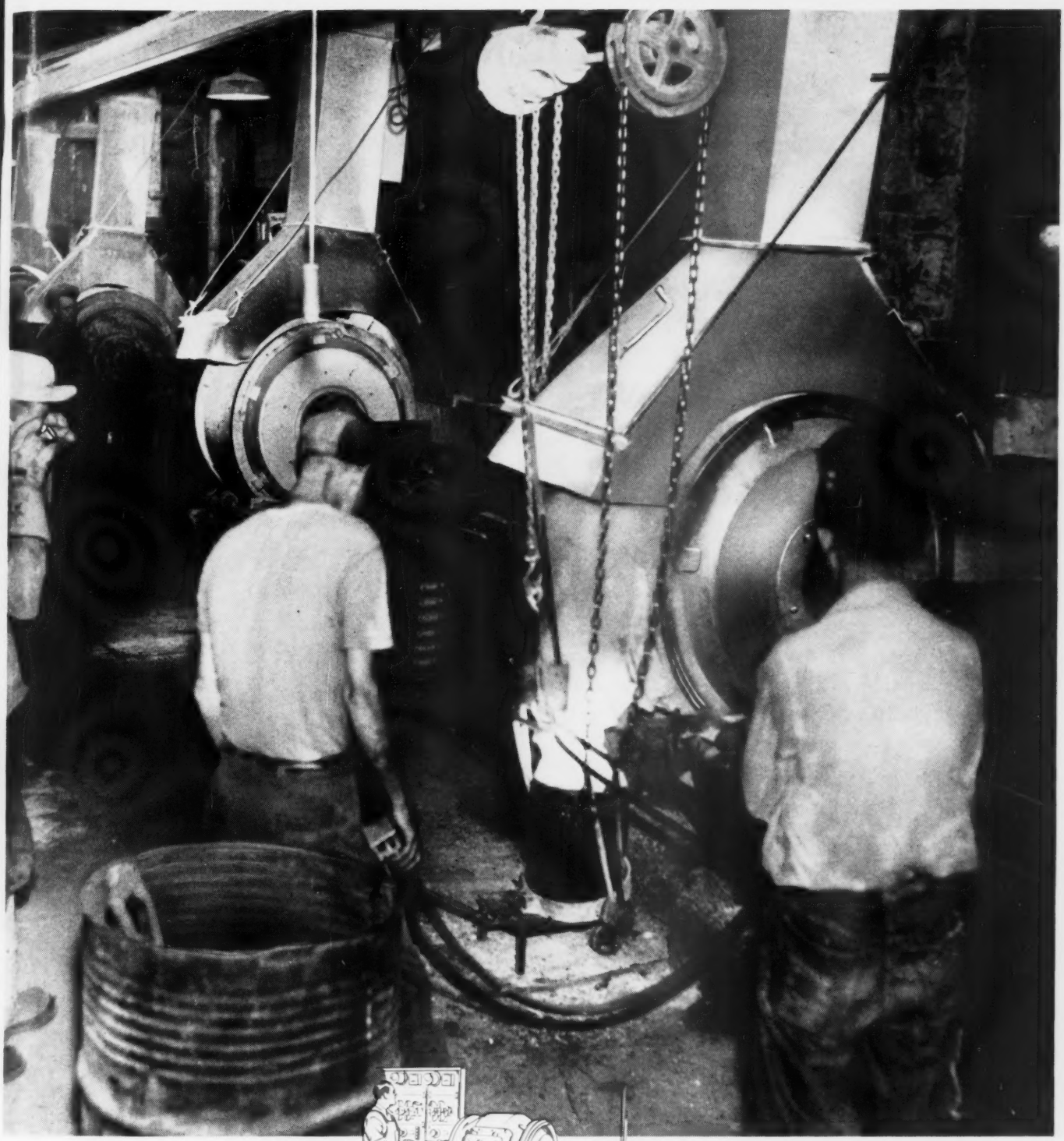
Furnace capacities from 10 to 4000 pounds.

Investigate the advantages of operating Detroit Electric furnaces—for long and short production runs—in your plant. Write today for complete information.

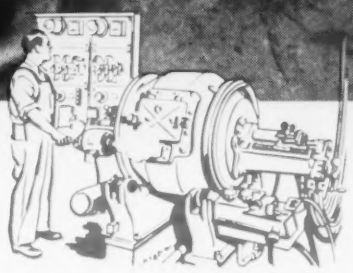
DETROIT ELECTRIC

Kuhlman Electric Company

Foreign Representatives: in BRAZIL—Equipamentos Industrias, "Eisa" Ltd., Sao Paulo; CHILE, ARGENTINA, PERU and VENEZUELA: M. Castellvi Inc., 150 Broadway,



Faster heats, better metal



ROCKING ACTION DOES IT!

FURNACE DIVISION

Bay City, Michigan

New York 7, N.Y.; MEXICO: Cia Proveedora de Industrias, Atenas 32-13, Apartado 27A3, Mexico 6, D. F., Mexico; EUROPE, ENGLAND: Birlec, Ltd., Birmingham.

Get the most for your money

You can expect...and get cost-saving advantages by using TAM* ZIRCONITE* Products whether your operation is a steel, iron, bronze, aluminum or magnesium foundry.

ZIRCONITE* Paste Wash will not fuse with molten metal. It resists metal wetting, prevents metal penetration and produces smooth casting surfaces. Its uses in all types of foundries are "universal."

ZIRCONITE* Flour...used as a filler in cores, lowers permeability and increases refractoriness.

With ZIRCONITE* Sand...the problems of burning-in and penetration can be entirely eliminated. Aluminum and magnesium foundries have found ZIRCONITE* an excellent means of chilling heavy sections to promote directional solidification and to eliminate heavy risers.

Even a brief investigation of ZIRCONITE* Products will convince you of their time and money saving advantages. Why not write our New York City Office for detailed facts today.

TAM PRODUCTS
Registered U. S. Pat. Off.

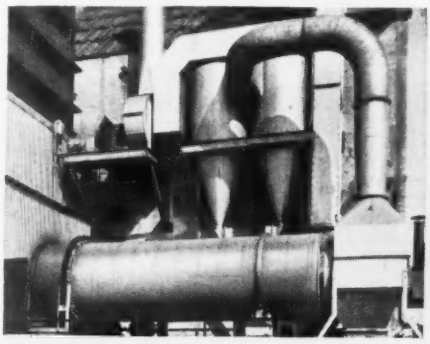
TITANIUM ALLOY MFG. DIVISION
NATIONAL LEAD COMPANY

Executive and Sales Offices:
111 Broadway, New York City

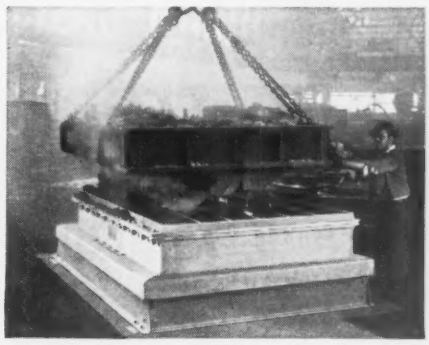
General Offices, Works and Research Laboratories.
Niagara Falls, New York

*Registered trademarks

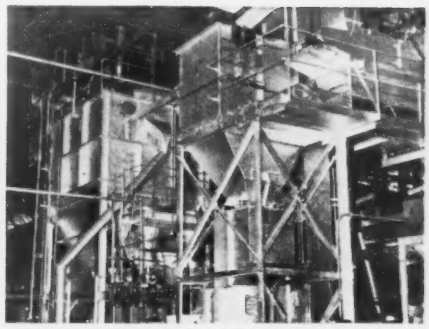
For handling sand and castings--



DRYERS — Link-Belt Roto-Louvre uniformly dries and cools large tonnages of sand. Floor space is conserved because no extra cooler is required.

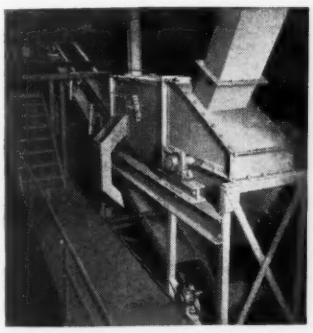


SHAKEOUTS AND SCREENS — Complete line provides centralized separation of sand and castings or sand screening for every type and size foundry.

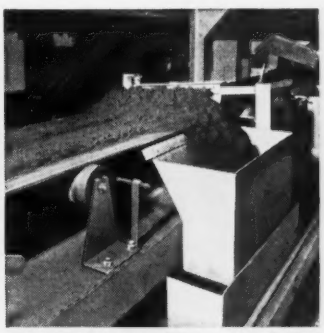


BUCKET ELEVATORS AND BINS — Low-cost elevating and storage of sand. Sturdily built in a wide range of types and sizes.

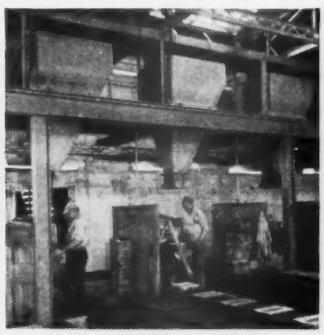
LINK-BELT quality equipment...



REVIVIFIERS — Thoroughly disintegrate, blend, cool molding sand so it will ram to uniform density. Also remove shot.



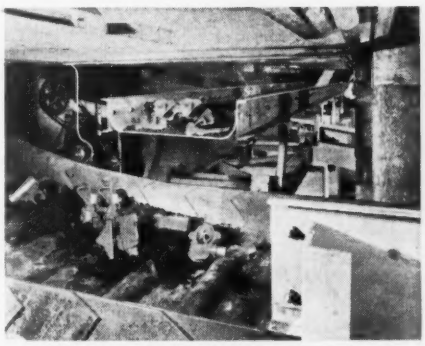
BELT CONVEYORS — Flat belt has plows to distribute sand to molders' hoppers. Troughed type used for other sand handling.



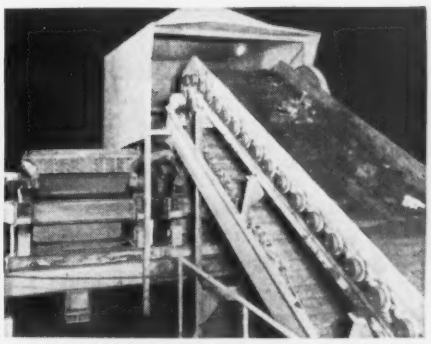
MOLDING HOPPERS — Built to avoid arching and allow free sand discharge with easy-operating duplex discharge gates.

MOLD CONVEYORS — A full line of car, pallet, roller and trolley types meets all variations of foundry practice.

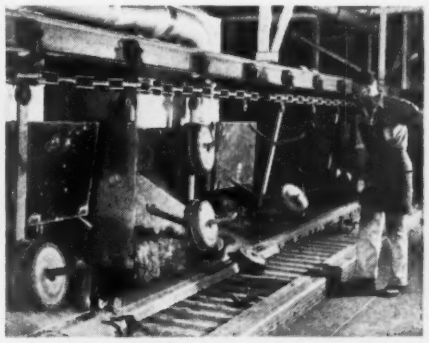
cuts your costs every step of the way



OSCILLATING CONVEYORS — Ideal for hot shakeout sand and castings. One-piece, all-metal trough eliminates wear, leakage. With screened trough section, acts as shakeout.



APRON CONVEYORS — No-leak design for long-life service on hot sand and castings. Operates in horizontal or steeply inclined paths. Also good as sorting conveyor.



OVERHEAD TROLLEY CONVEYORS — Cores, molds and castings are economically handled. Complete flexibility of path and capacity provided plus saving of floor space.

Ask your nearest Link-Belt office for new Book 2423. It shows Link-Belt's complete line of modern equipment for ferrous and non-ferrous foundries plus 7 tested layouts.

LINK-BELT

CONVEYORS AND PREPARATION MACHINERY

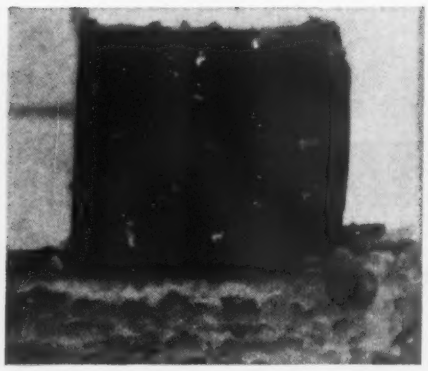
MEMBER FEMA

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

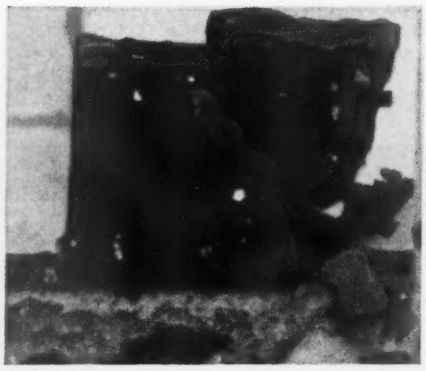
13.553

OUTSTANDING CUPOLA CAST IRON DEOXIDIZER!

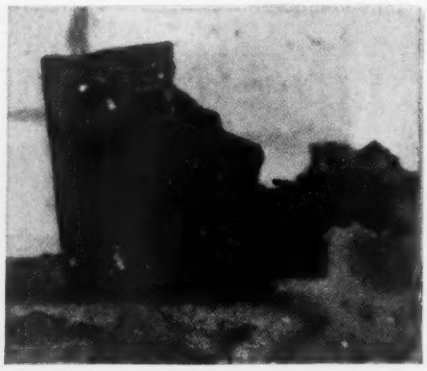
This FERROCARBO patented Briquette disperses completely in 57.5 seconds



14 SEC.



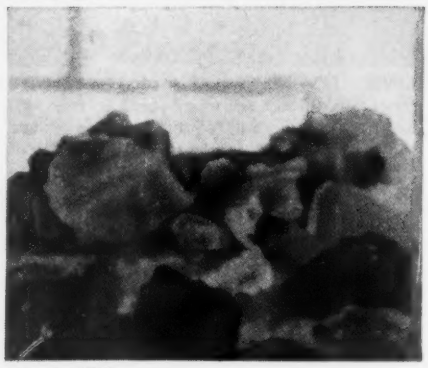
29 SEC.



36 SEC.

43 SEC.

50 SEC.



57.5 SEC.

Here's dramatic proof, in actual film sequences, that FERROCARBO Briquettes are truly *effective* in deoxidizing cupola iron. Rapid, controlled disintegration of FERROCARBO Briquettes is *complete* in the melting zone. 100% dispersion of the briquette throughout the metal means a thorough reaction in the cupola. You can't match FERROCARBO Briquettes for uniform cupola operation . . . for castings that are cleaner, more uniform, easier to machine. No wonder nearly 600 leading foundries are deoxidizing their cast and malleable iron with FERROCARBO Briquettes!

FERROCARBO

TRADE MARK

Briquettes by CARBORUNDUM

PHONE OR WRITE THE FERROCARBO DISTRIBUTOR NEAREST YOU

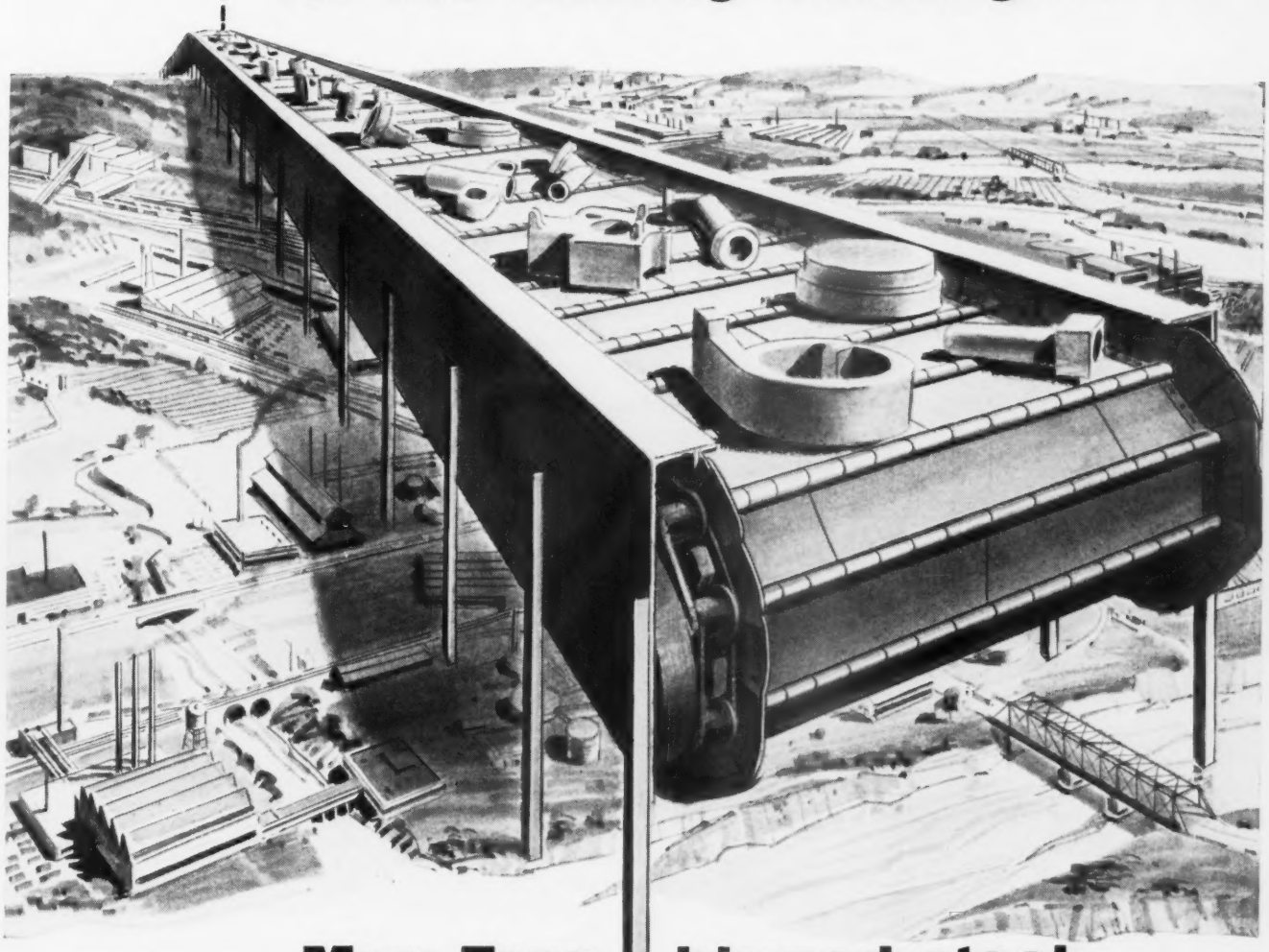
KERCHNER, MARSHALL & CO.
PITTSBURGH • Cleveland • Buffalo
Philadelphia • Birmingham • Los Angeles

MILLER & COMPANY
CHICAGO • St. Louis • Cincinnati

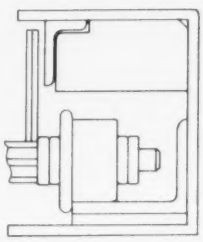
WILLIAMS & WILSON
TORONTO • Montreal • Windsor

"Carborundum" and "Ferrocarbo" are trademarks which are registered in the U. S. by The Carborundum Company, Niagara Falls, New York, and in Canada by Canadian Carborundum Company, Ltd., Niagara Falls, Ontario.

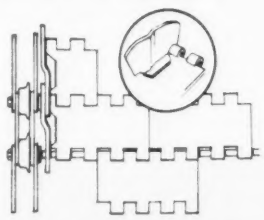
for the foundry industry . . .



May-Fran hinged-steel conveyor belting



Drawing shows construction details of "skirt" which prevents entry of foreign matter and protects side chains.



Outside links incorporate interlocking wings . . . remain positively engaged at all times.

MAY-FRAN Hinged-Steel Belting can take it! Built to withstand excessive punishment from hot, heavy or abrasive parts, MAY-FRAN Belting is designed for the long haul.

Precision formed, heavy-gauge hinged-steel links are connected in horizontal rows by means of high-carbon steel rods. Side chains become an integral part of the belt, and outside links incorporate interlocking wings which remain positively engaged at all times. Link and rod construction eliminates fall-through.

MAY-FRAN Hinged-Steel Conveyor Belting can be furnished in widths from 6 inches to 6 feet to meet specifications and in any length or carrying capacity. Either solid or perforated links are available in 2½, 4, 6, 9, and 12-inch pitch lengths.

1899-MF

WRITE TODAY FOR COMPLETE INFORMATION

MAY-FRAN

DESIGNERS AND BUILDERS OF COMPLETE HANDLING SYSTEMS

ENGINEERING, INCORPORATED

1692 CLARKSTONE ROAD • CLEVELAND 12, OHIO

Advertisement

ELECTROMET Data Sheet

A Digest of the Production, Properties, and Uses of Steels and Other Metals

Published by Electro Metallurgical Company, a Division of Union Carbide and Carbon Corporation, 30 East 42nd Street, New York 17, N. Y. • In Canada: Electro Metallurgical Company, Division of Union Carbide Canada Limited, Welland, Ontario

Why 3 Per Cent Chrome Steel Makes Good Castings for Wear Resistance

Castings of 3 per cent chromium steel have been used in substantial tonnages, for many years, for various equipment parts demanding good wear resistance. Such castings offer an excellent combination of hardness and toughness. Typical applications are crusher parts used in rock- and ore-crushing equipment, swing hammers for pulverizing coal, railroad switch frogs, gears, pulleys, sheaves, and other castings that must meet severe conditions of wear.

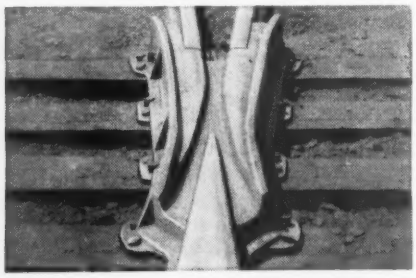


Fig. 1. Railroad switch frogs, which are subject to severe wear, give outstanding service when cast of 3 per cent chromium steel.

The 3 per cent chromium steels, are normally produced in a carbon range of 0.30 to 0.50 per cent. They exhibit excellent depth-hardening properties, which simplify heat-treatment and insure uniformity throughout heavy sections. The analysis is usually modified by a molybdenum addition, since this element aids in increasing hardenability.

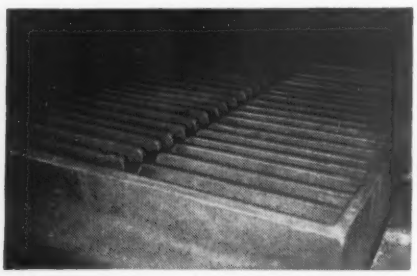


Fig. 2. Grating for top of shake-out machine is cast of 3 per cent chromium steel to give good wear resistance and long life.

Properties Improved by Heat-Treatment

The best properties of 3 per cent chromium steels are developed through heat-treatment. Generally, this consists of a normalizing treatment from 1650 deg. F., followed by tempering in a range between 1000 and 1250 deg. F., depending on the physical properties desired. Double normalizing is sometimes used to obtain further improvement in the grain structure. With carbon on the high side of the specification, air-quenched castings show a Brinell hardness number of over 400 in 3-inch sections. This hardness is practically uniform throughout the section. Oil quenching is employed to produce higher hardness and depth of penetration, and even in a 4-inch section, a hardness number of over 500 Brinell is obtained.

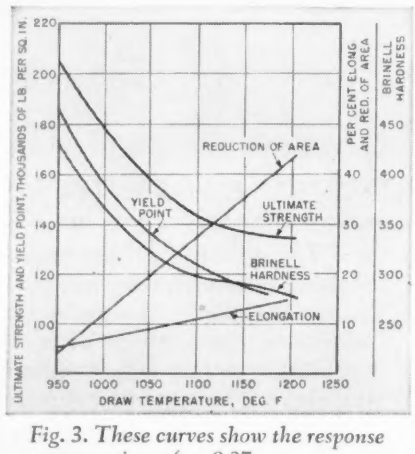


Fig. 3. These curves show the response to tempering of a 0.37 per cent carbon, 2.93 per cent chromium, 0.35 per cent molybdenum steel previously normalized from 1650 deg. F.

The steel also shows good response to tempering. After a normalize and a 1100 deg. F. treatment, it has a tensile strength close to 150,000 pounds per square inch, with an elongation value of about 12 per cent, and a Brinell hardness of about 300. When greater ductility is required, tempering should be done at higher temperatures. However, in such instances, some strength and hardness are sacrificed.

Fig. 4. Photomicrograph of 3 per cent chromium steel normalized from 1650 deg. F. and tempered at 100 deg. F. (X250). The pseudo-martensitic structure is well suited to resist abrasion.

Effect of Other Alloy Additions

Molybdenum in the range from 0.30 to 0.50 per cent will improve depth-hardening characteristics and aid in reducing susceptibility to temper brittleness in the lower temperature ranges. If the molybdenum-bearing steel contains relatively high carbon (0.40 to 0.60 per cent) additions of approximately 0.08 to 0.10 per cent vanadium provide greater uniformity in hardening. Small additions of silicon increase strength and hardness and this element is sometimes increased to 0.80 or 1.00 per cent. Manganese is added in amounts between 0.50 and 0.80 per cent.

Metallurgical Service Available

When you have occasion to produce castings for applications involving severe abrasion and wear, it will pay you to investigate the advantages of using 3 per cent chromium steel. If you need help on some specific metallurgical problem, be sure to consult one of ELECTROMET's specially trained metallurgists and engineers. For further information, write to the nearest ELECTROMET office: in Birmingham, Chicago, Cleveland, Detroit, Los Angeles, New York, Pittsburgh, or San Francisco. In Canada: Welland, Ontario.

The term "Electromet" is a registered trademark of Union Carbide and Carbon Corporation.

Need help on molding practice?

CALL IN THE REPUBLIC PIG IRON METALLURGIST

His knowledge of foundry operations is based on years of actual foundry experience plus a thorough knowledge of all types of pig iron.

Hundreds of foundrymen regularly keep in touch with the Republic Pig Iron Metallurgist. They rely on him to help solve foundry problems or answer questions on molding practice.

Frequently he is called in to make an operational survey. His recommendations often result in improved foundry operation, increased production efficiency and unit output with no increase in overhead costs.

Republic, the only producer of a complete line of merchant pig irons, offers you this metallurgical service without cost or obligation.

Write, wire or phone us when you would like to have a Republic Pig Iron Metallurgist call at your plant.

REPUBLIC STEEL CORPORATION
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, New York

REPUBLIC PIG IRON

"CHATEAUGAY"	REPUBLIC	REPUBLIC
Low-Phosphorous, Copper-Free	(Northern) Foundry, Bessemer Basic and Malleable	(Southern) Foundry and Basic

REPUBLIC STEEL

YOU'LL DO A BETTER JOB

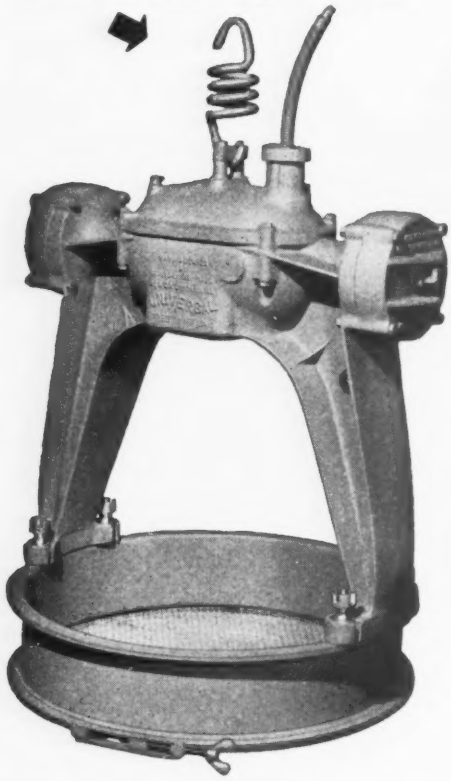
with H. V. ADAMS DESIGNED

HIGH EFFICIENCY FOUNDRY TOOLS

"UNIVERSAL FREE WHEELING"

FOUNDRY SAND RIDDLE

with the Double Eight Vibration

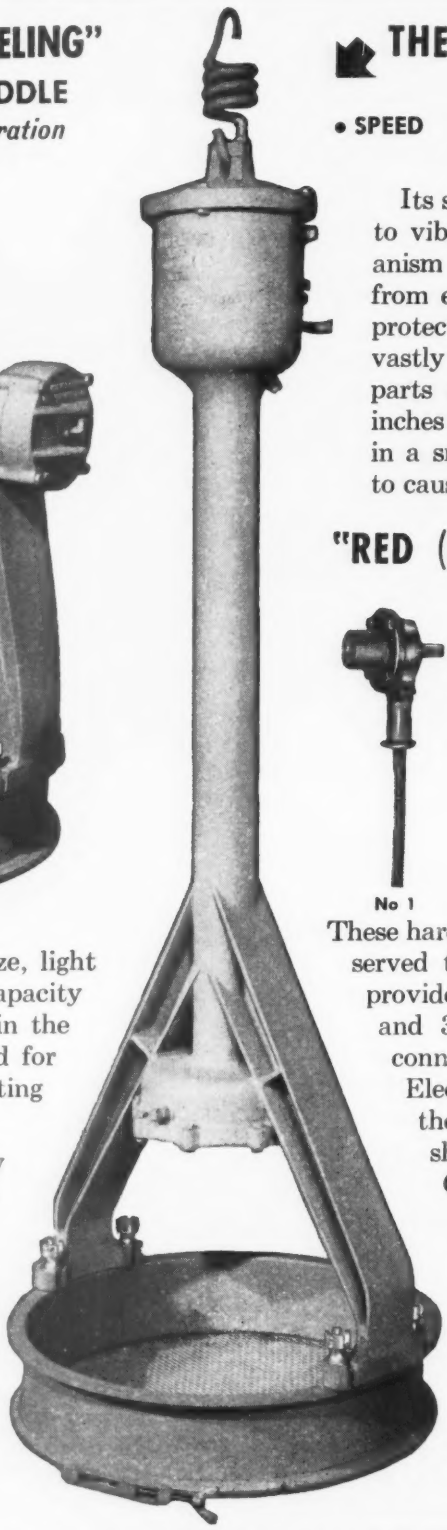


Because of its convenient size, light weight and good riddling capacity it long has been a favorite in the foundry. It also can be used for mixing core sand or for sifting sand directly into molds.

The mechanism is entirely enclosed protecting it from harmful dust and grit.

The main frame is cast in very strong tough aluminum.

It uses quick change ferruled sieves with 20 in. diameter sifting area. There are no loose wires to harm hands.



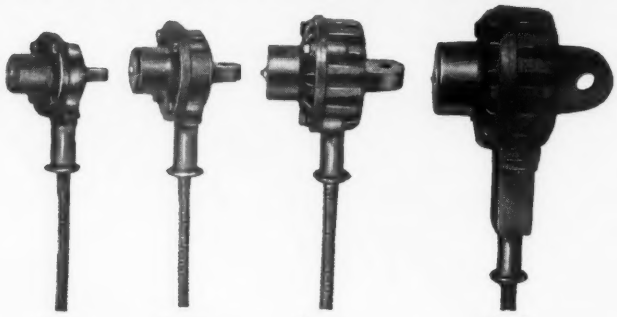
THE "ROTOPLANE" SPEED SIFTER

WILL GIVE YOU

- **SPEED**
- **ECONOMY**
- **SAFETY**
- **LONGER LIFE**
- **GREATER SIFTING CAPACITY**

Its sturdy one-piece frame and long shaft add to vibration effectiveness. The sealed-in mechanism assures protection of motor and bearings from exposure to dust and grit. This sealed in protection and "Rotoplane's" free-rotary action vastly increase bearing life. No exposed moving parts endanger the operator. Sieves have 20 inches diameter clear sifting area—are mounted in a smooth steel ferrule with no jagged edges to cause dangerous cuts and scratches.

"RED (Devil) ELECTRIC" VIBRATORS



No 1 No. 2 No. 5 No. 9

These hard hitting Adams designed Vibrators have served the foundries for over 30 years. They are provided with a 6 foot 3 wire authorized cable and 3 wire grounded connector which, when connected with our 3 wire grounded Red Electric Knee Switch, automatically grounds the vibrator protecting the worker from shock. The vibrators have passed the U. S. Government code inspection.

Other Foundry Products:

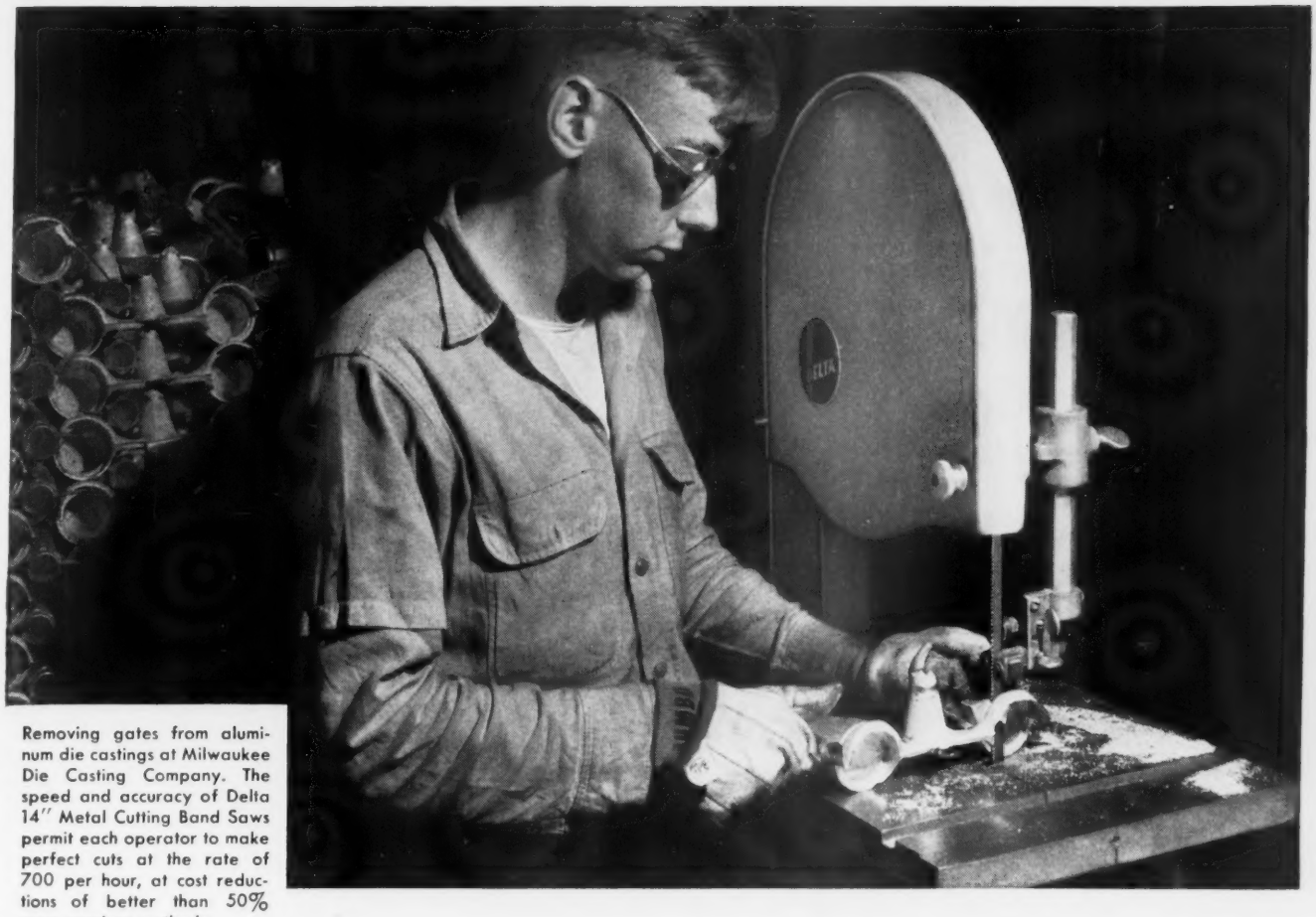
- **No. 11 NOISELESS TYPE VIBRATOR**
- **A-20 ELECTRIC VIBRATOR**
- **RED ELECTRIC KNEE SWITCHES**
- **"ROTO" ADJUSTABLE BIN VIBRATOR**
- **2 MIN. UNIVERSAL FINENESS TEST SIFTER.**
- **UNIVERSAL TRIPOD CARRIER**

ORDER ALL SIFTERS AND VIBRATORS WITH GROUND WIRE!!

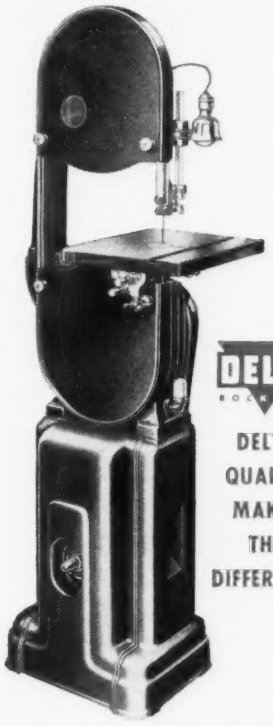
FOUNDRY SUPPLIES MANUFACTURING CO., NOT INC.

2221 Orchard Street - Chicago 14, Illinois

Established 1918 **Cable Address: "Rotoplane Chicago"** **H. V. ADAMS, Mgr.**



Removing gates from aluminum die castings at Milwaukee Die Casting Company. The speed and accuracy of Delta 14" Metal Cutting Band Saws permit each operator to make perfect cuts at the rate of 700 per hour, at cost reductions of better than 50% over previous methods.



With five cutting speeds, this 14" Delta Metal Cutting Band Saw cuts anything from carbon tool steel to wood and plastics. Tilting table and positive, micrometer controlled accuracy permit close tolerance work on even the most intricate patterns. Completely portable.

"Rejections Eliminated.... GATE REMOVAL COST SLASHED 50% PLUS" with Rockwell-built DELTA METAL CUTTING BAND SAWS

DELTA ROCKWELL

DELTA QUALITY MAKES THE DIFFERENCE

"Our Delta Metal Cutting Band Saws have cut costs of gate removal on castings of varied design by better than 50%," report production executives of the Milwaukee Die Casting Company. "They make a perfect cut, have eliminated rejects, and give us far better castings for plating."

Here it is again—PROOF that Delta Metal Cutting Band Saws—and other Delta Power Tools—definitely cut foundry costs, from pattern making to finishing and machining. In foundries and metalworking plants everywhere, the ability of Delta Power Tools to handle multiple jobs quickly and accurately is consistently reducing operating costs, and making for better, higher quality production.

Talk to your Delta Dealer today! Let him prove how Delta Power Tools can save YOU money. He's listed in your classified directory under "Tools" or "Machinery." In addition, send the coupon for full information.

ROCKWELL

DELTA QUALITY POWER TOOLS

Another Product by Rockwell

Delta Power Tool Division,
Rockwell Manufacturing Co.
706G North Lexington Avenue, Pittsburgh 8, Pa.

☐ Please send Delta AB-54 Catalog.

☐ Please send name of my nearest Delta Dealer.

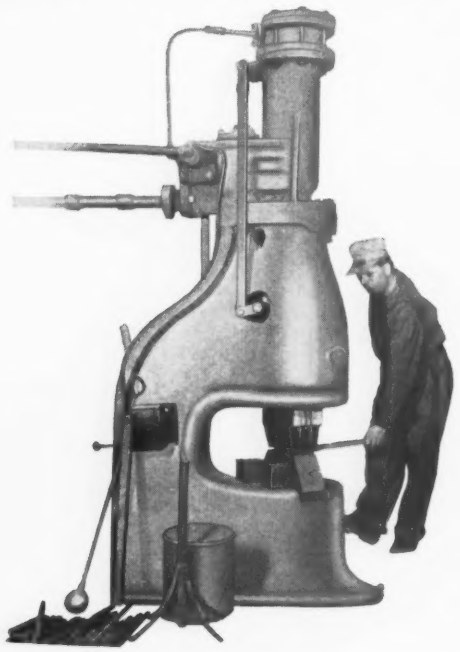
Name _____

Title _____ Company _____

Address _____

City _____ County _____ State _____

EVERY FOUNDRY CAN SAVE MONEY ON TOOL DRESSING HAMMERS



SIZE POUNDS	FACE OF RAM Inches	USUAL DIE FACE Inches	FLOOR SPACE Inches	AVERAGE AIR CONSUMPTION CFM at 100 psi
100	3½x6¾	3x6½	32x20	32
150	4¾x6¾	3x6½	32x20	39
200	5x7¾	4x7	40x26	58
250	6x7¾	4x7	40x26	65
300	7x7¾	4x7	40x26	73
400	6½x9¼	5x8½	50x32	104
500	8x9¼	5x8½	50x32	116

ADEQUATE CAPACITY AT LOW INVESTMENT

Here is the answer to the foundryman's need for a general utility forging hammer to take care of the tool dressing or general light blacksmithing work that every foundry finds need for.

Size for size there's no better buy than a Chambersburg. Costs less to install, costs less to operate, costs less to maintain. Easy to run, easy to control. Variable stroke permitting wide flexibility of operation.

NO NEED FOR SELF-CONTAINED COMPRESSOR. Can be run off the average foundry air line, eliminating the cost of a built-in compressor. Installation is easy. Frame and anvil are one piece, avoiding costly foundation. Most rugged hammer built. The first one we made over 50 years ago is still pounding.

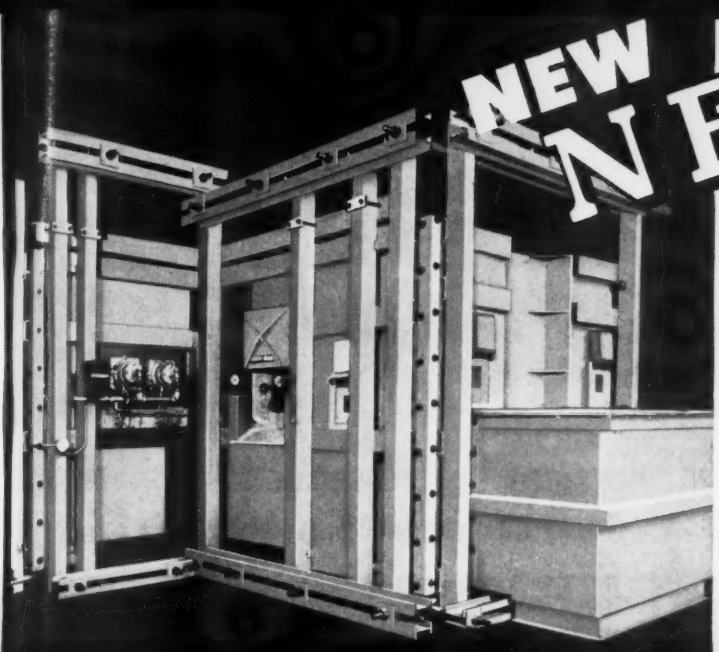
Write today for descriptive bulletin No. 7-L-8.

CHAMBERSBURG ENGINEERING COMPANY • CHAMBERSBURG, PENNA.

CHAMBERSBURG

THE HAMMER BUILDERS

NEW NEW NEW!



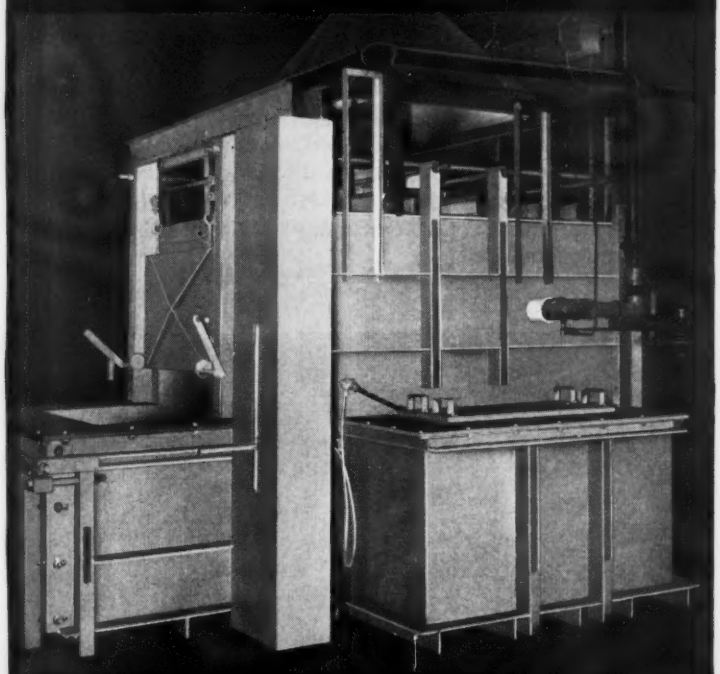
Made for 120,000 lbs. Zinc

STROMAN NOW OFFERS A COMPLETE LINE OF REVERBERATORY FURNACES FOR THE MELTING OF . . .

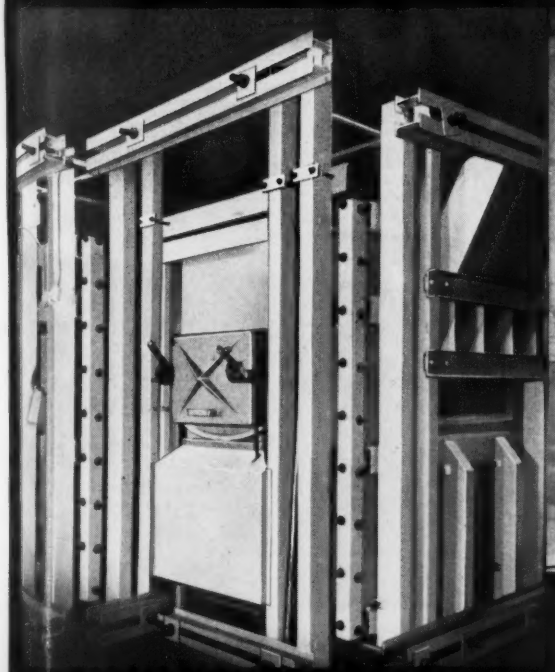
ALUMINUM, ZINC, BRASS

Capacities are unlimited

These reverbs are built to assure heavy duty production for Smelting, Extrusion work, Die Casting, Permanent Molding and Foundry melting. Now in operation in some of the most prominent plants in the country they have proved their ability to deliver great volumes of metal that results in perfect castings, every time. They are easy to work with and around . . . operate most economically and are easy to maintain. Their efficiency and economy will amaze you and convince you of their superiority to any other furnace available. Why not write to-day for full information.



Made for 16,000 lbs. Zinc



Made for 40,000 lbs. Aluminum

Made for 25,000 lbs. Aluminum

STROMAN FURNACE & ENGINEERING CO.

DIVISION OF

THE PETERSEN OVEN CO., FRANKLIN PARK, ILL.

NEWAYGO sand handling equipment DOING A

BALL BRASS AND ALUMINUM FOUNDRY INCREASES CASTING OUTPUT 40% WITH THE HELP OF THREE TWIN HOPPER HANDY SANDYS AND A CENTRAL SAND PREPARATION UNIT

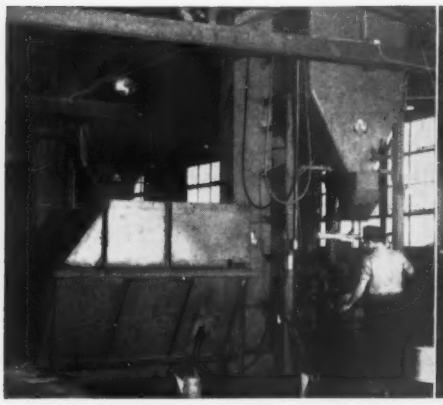
Walter and Bob Ball, partners in the largest non-ferrous jobbing foundry in Indiana, say "We feel that the big feature of our Newaygo equipment is its acceptance by labor. Not only has it offered the means of increasing production, but it ties in with our incentive system and has been instrumental in substantial wage increases.

"Our previous operation called for as many as 9 molders. They produced 125,000 lbs. of castings per month. Now, we have 6 squeezer molders working the three Twin Hopper Handy Sandys and one molder for combination bench and floor work. Finished casting output has increased to 175,000 lbs. per month.

"To keep up with the continuous pour off, melting capacity has been 'upped' from seven #70 crucibles to nine #80 crucibles.

"Other labor consists of four men shifting weights and shaking out, plus one man operating the Newaygo Sand Preparation Unit and the Motorized Loader for loading the Handy Sandy Feed Hoppers.

"Maintenance on the Newaygo System has been negligible over a year and a half that it has been in operation."



Partial view of foundry interior showing two Twin Hopper Handy Sandys. Type of castings produced are primarily for the electrical, plumbing, steel and bearing industries. Flask sizes range from 12" x 16" to 22" x 42". Largest casting weighs 900 lbs. 75% of molds require cores.

The Handy Sandy unit in the background is producing a 90 lb. casting to be used as a component part of an electrical switch. This job is done in a 21" x 37" flask with a 10" cope and 10" drag.

Note motorized loader filling Handy Sandy Feed Hopper.

A feature of the Ball Foundry is the simplified setout and central pour off system. Molds from the Handy Sandys are placed on palletized setouts and transferred to the central pour off station, which is a continuous pouring operation. Metal for pour off is delivered directly from the crucible room by an overhead crane. Smoke and fumes are effectively removed by large ceiling fan directly over the central pour off.

The third Twin Hopper Handy Sandy is shown in the left background.

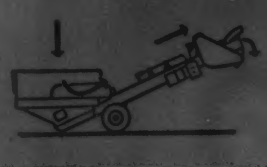
Molds are transferred from the pour off directly to the shakeout. Sand and castings are separated and sand is delivered by bucket elevator to a sand storage and conditioning unit. Man in center of picture is operating Mullor into which sand goes for further conditioning before he delivers it to the Handy Sandys via the motorized loader. Handy Sandy units have built in aerators that give sand a final conditioning before delivering it to the flasks.

System contains approximately 50 tons of full synthetic sand.

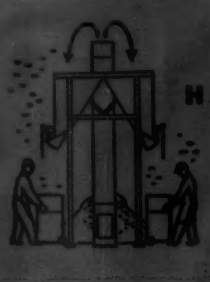
HANDY SANDY

puts sand overhead, eliminating shoveling for the molder.

REDDY SANDY



takes the hard work out of shakeout and sand preparation.



SUPER HANDY SANDY

a high capacity individual-floor sand handling unit.

G A JOB IN AUBURN, INDIANA

AUBURN FOUNDRY, INC. CHOOSES NEWAYGO ENGINEERING CO. FOR THEIR SAND HANDLING AND CONDITIONING SYSTEM

"When our foundry 'threw out the shovel' in favor of mechanization, we picked Newaygo to work with us because of their experience in engineering and fabricating sand handling systems" states Dick Fink, President and General Manager. "Service was also an important factor where we could count on Newaygo."

"Since installing the Newaygo Sand Handling and Conditioning System, increases in casting production, improved pour off and sand handling have been very evident. Substantial labor savings and better working conditions are other advantages we have gained.

"The sand storage capacity of the unit is 120 tons — moving 50 tons per hour. Sand is fed through an overhead conveyor system to fourteen hoppers and one special Sand Slinger unit. Flask sizes vary from 12″ x 12″ up to 2′ x 11′, the latter used on the Sand Slinger. Castings weigh from 1 to 500 lbs. each and are for automotive, farm equipment, pump, hydraulics and refrigeration industries.

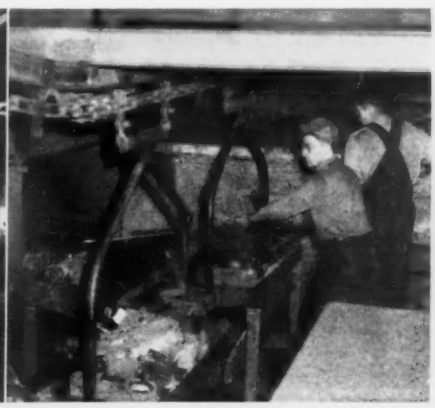
"Maintenance on the system has been very low."

Formerly "the shovel gang," these 14 molders now spend a maximum amount of time preparing molds, and with less fatigue. Note air operated gates on hoppers that further eliminate effort on the molder's part. Cope and drag setups on system allow molds up to 30″ x 33″ to be produced.

Hoppers and conveyor service walkway are supported from overhead building steel structure. This feature gives unobstructed working area under hoppers and around molding machines.

A portion of the mold storage area showing pour off and automatic shakeout. At present 50 to 60 tons of grey iron are poured here each day.

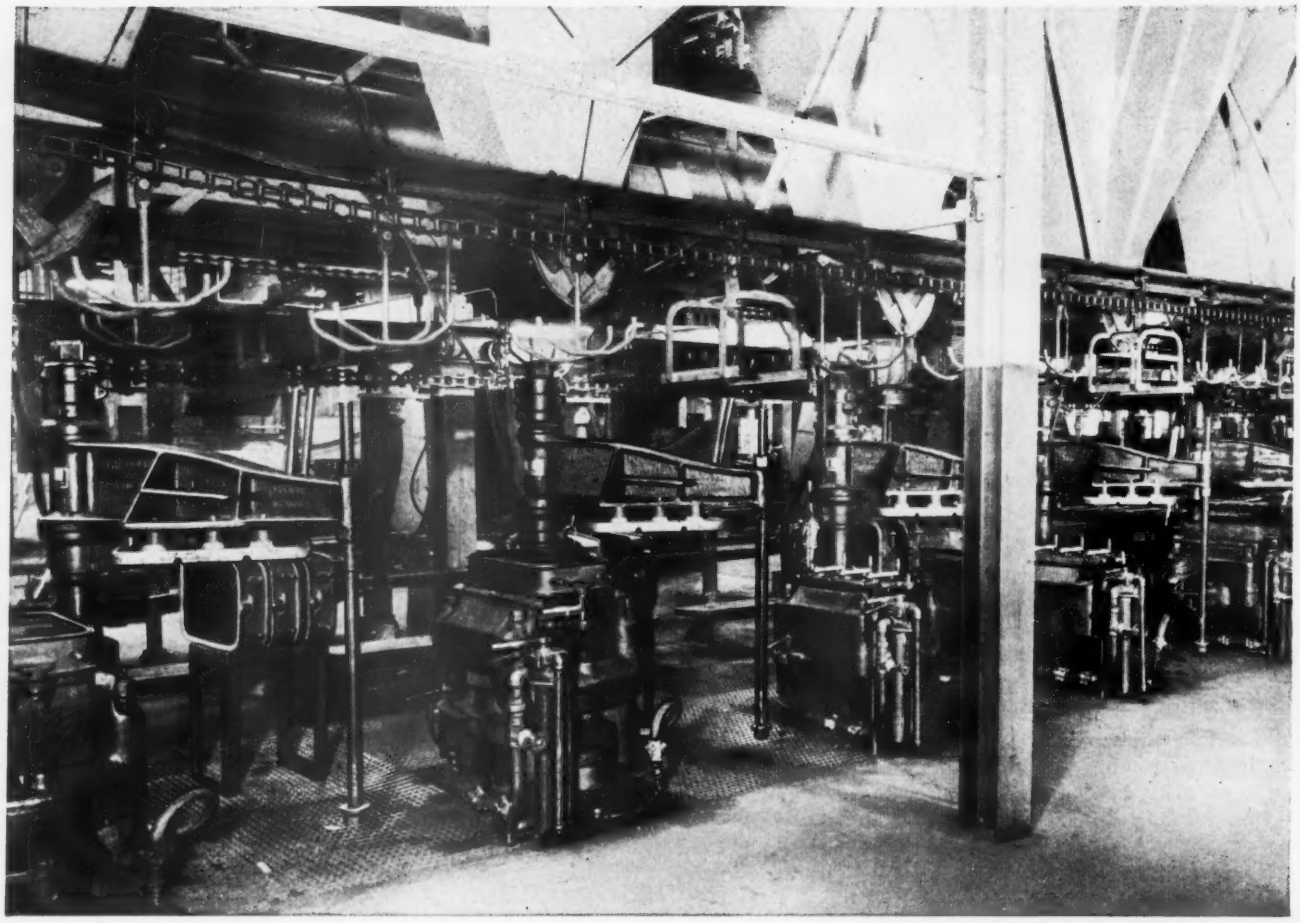
Molds are handled on pallet cars with molds automatically dumped at end of lines into a vibrating pan conveyor. Pallet cars and boards are returned automatically on an underneath track system.



A view of the casting handling and cooling conveyor from the discharge end of the shakeout unit.

A copy of "Planned Mechanization for Foundries" is yours for the asking. Write, wire, or phone today.

NEWAYGO engineering company
NEWAYGO, MICHIGAN
Manufacturers of Newaygo Mold Handling, Sand Handling and Conditioning Equipment

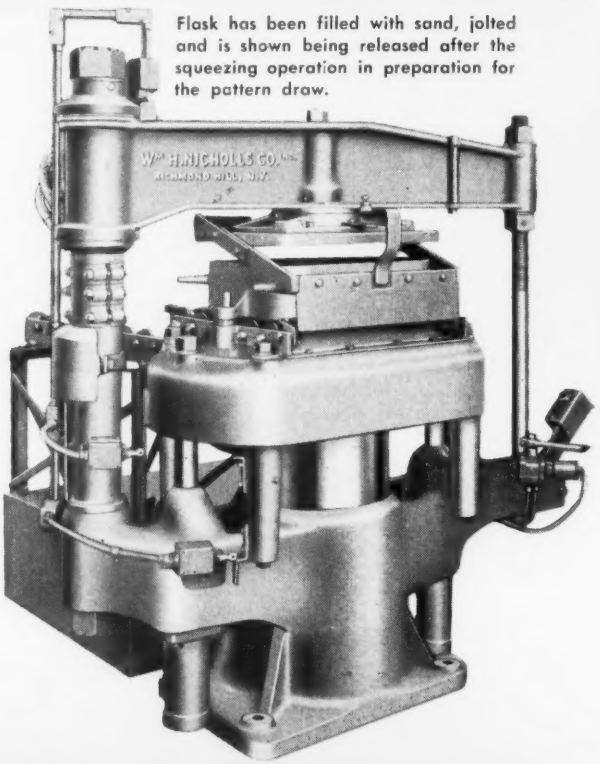


A BATTERY OF NICHOLLS MOLDING MACHINES IN A LARGE PRODUCTION FOUNDRY.

HEAVY DUTY Combination Jolt and Power Squeezer Molding Machines with pneumatic pattern draw and power operated self positioning parallel squeeze head, equipped with electrical controls for single push button automatic operation of jolt, squeeze, pattern draw and cross arm, including automatic sand strike-off, mold pusher and adjustable flask roll-off device.

Wm. H. NICHOLLS Co., Inc.
RICHMOND HILL 18, LONG ISLAND, NEW YORK

Established 1910



Flask has been filled with sand, jolted and is shown being released after the squeezing operation in preparation for the pattern draw.

NICHOLLS

GREEN-X SUPER DUTY GRAPHITE-TYPE PLASTIC REFRACTORY

A. P. Green REFRACTORY PRODUCTS

PROVED ON-THE-JOB TO GIVE YOU 6 ADVANTAGES

More tonnage per lining . . . made from the finest quality super duty fire clay.	1
Easier cleaning with less damage to the lining . . . less adhesion of slag and skull to the lining.	2
Reduces erosion of molten metal . . . develops strong bond throughout entire thickness.	3
Metals flow more easily through troughs and pouring spouts . . scientifically incorporated graphite has lubricating effect.	4
Provides cleaner metal and more perfect castings . . . successfully resists the attack of molten metal and slag.	5
Fewer laminations and less tendency toward shrinkage.	6

GREEN-X—
scientifically developed for long life in lining

Forehearth or Holding Ladles

Bull Ladles

Pouring Ladles

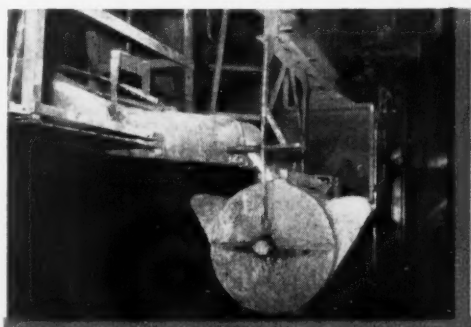
Hand Ladles

Cupola Wells

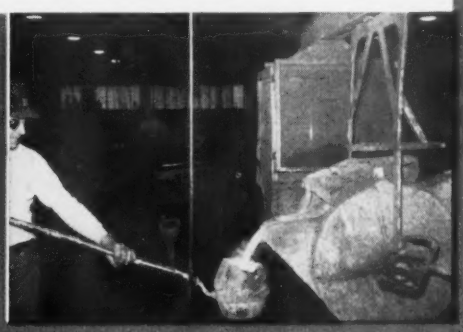
Cupola Slag Holes

Malleable Furnace —runners & spouts

Cupola —runners & spouts



1400-lb. capacity transportation ladle and cupola trough lined with Green-X.



Transportation ladle and pouring ladle are both lined with Green-X for longer life and cleaner metal.

Green-X is pre-sliced and conveniently packaged in 100-lb. waterproof cartons . . . designed for easy handling.

WAREHOUSE STOCKS FOR PROMPT DELIVERY

Look in the classified section of the telephone directory or write direct for the name of the A. P. Green distributor in your locality. He has complete stocks and can make prompt delivery.

A. P. GREEN FIRE BRICK CO.

MEXICO, MISSOURI, U. S. A.

In Canada
A. P. Green Fire Brick Co., Ltd.
Toronto 15, Ontario

DISTRIBUTORS IN THE PRINCIPAL CITIES OF THE WORLD

Photo Courtesy of Chain Belt Company Milwaukee, Wisconsin

MULTIPLY PRODUCTION *with* **Sterling** **MULTIPLE STACK MOLDING FLASKS**

Multiple stack molding with Sterling Foundry Flasks is helping the Chain Belt Company increase production way beyond expectations. And efficient continuity of operations paves way for top quality results and greater economies.

speeds casting output • cuts costs • saves valuable plant area

Their unique ability to withstand tremendous pressures makes Sterling Foundry Flasks ideal for modern stack molding. In spite of the increased amount of hot metal in relation to total flask volume in stack molding (which generates great heat and gas pressure) Sterling's special rolled steel channel and reinforcing ribs . . . with tensile strength over 70,000 p.s.i. . . . prevent distortion and misalignment of the stacked molds. Sterling Flasks retain rigidity and accuracy under constant production pressure. For long runs of small or shallow castings, Sterling multiple stack molding MULTIPLIES profits. See your Sterling representative.

Sterling
WORLD WIDE SERVICE

Write for Catalog

STERLING WHEELBARROW COMPANY
Main office and plant • MILWAUKEE 14, WIS., U. S. A.
Branches and Dealers in Principal Cities
Subsidiary Company: STERLING FOUNDRY SPECIALTIES LTD.
LONDON • BEDFORD • JARROW-on-TYNE, England

FOR NEARLY HALF A CENTURY *manufacturers of* FOUNDRY EQUIPMENT

A 7940-1PC

Controls Ahead?

History not only repeats itself in the foundry industry; it rides on a merry-go-round and grabs desperately for the brass ring.

Once again foundry business is off, due to the slackening of production among castings consuming industries. And once again, the foundry industry is having its miseries in the matter of prices.

Traveling around the country and talking with foundrymen, we hear reports of senseless and frequently ruthless price cutting. Instead of using the real tools of castings sales promotion—namely quality, utility, service and a fair price—some appear to be placing the entire sales pitch on price alone.

If these reports from the field are not exaggerated, it would seem that some companies probably will not be around to enjoy a pickup in business when it arrives. You just don't give away a bit of the company assets as a premium with each order for castings and continue to stay in business.

Nevertheless, several factors appearing on the horizon may have an even more important bearing on the problem. Rumors are abroad that basic steel may grant some small wage increase. Should some portions of the foundry industry continue blindly to follow this lead, how will the added costs be absorbed?

Today, talk in Washington concerns the possibility of intervention in Indo-China. While thinking people everywhere pray for strength and guidance for our leaders that the catastrophe of World War III can be avoided, the prophets of doom see little chance of peace.

Should war come in any form, controls will be a must, if only from the standpoint of political expediency. In fact, those in the know at the nation's capital report that orders for controls already have been prepared.

Foundrymen who went through the trying period following the establishment of price controls in World War II know first hand the penalty for prices which do not cover cost of production plus a fair profit.

How would you stand if controls were to be applied in the not too distant future?

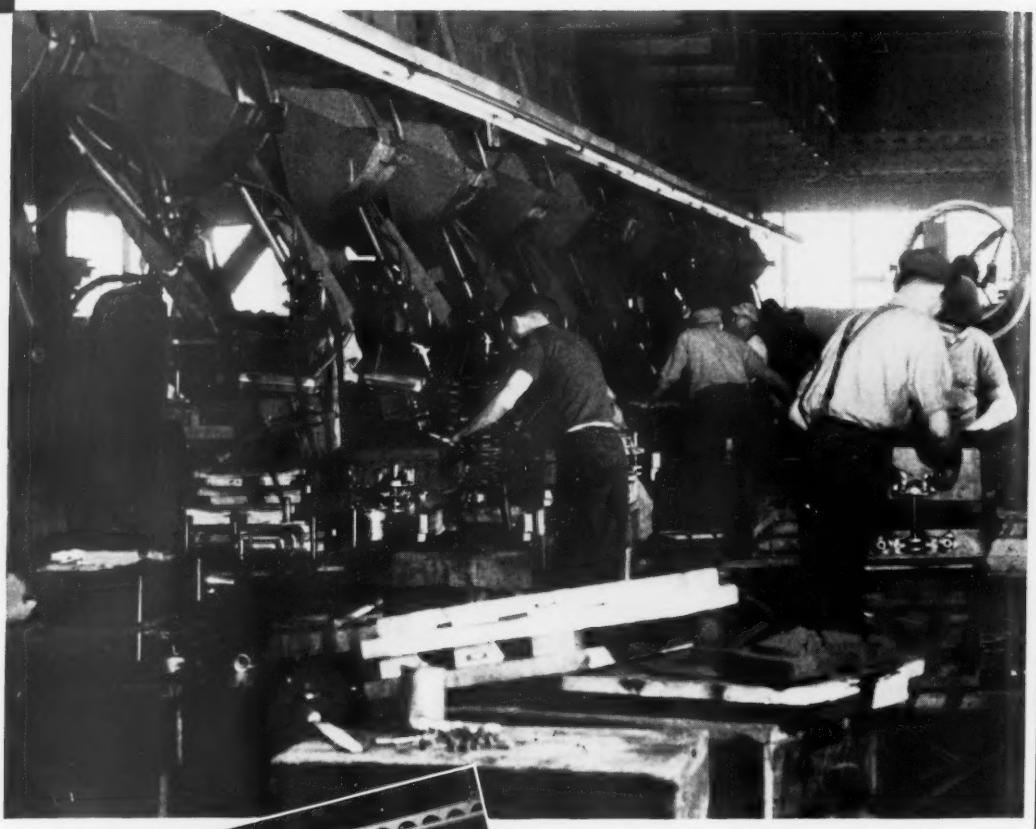
In the face of possible future developments, we should repeat, "Let's quit sharpening pencils" unless this sharpening is based on sound costs plus a fair profit.

Frank G. Steinebach

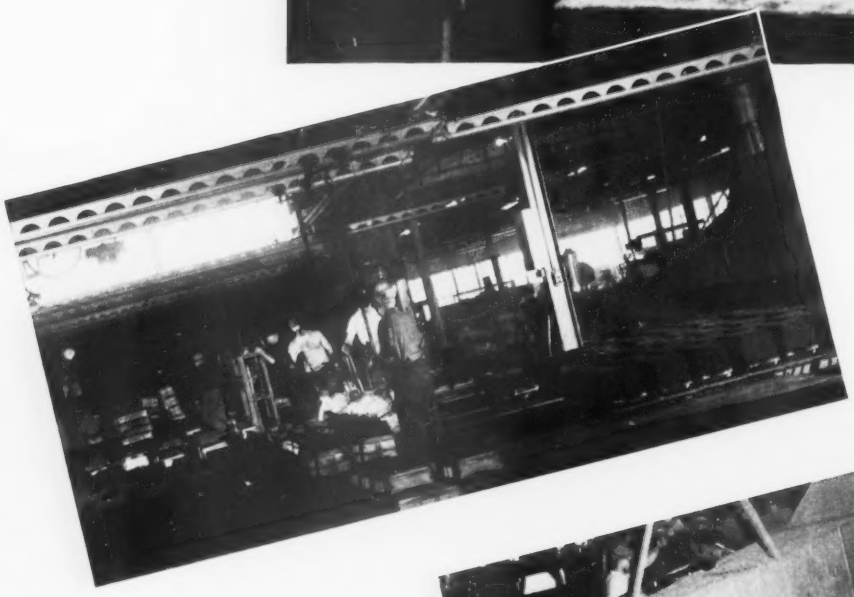
Editor

Small Foundry Is Rebuilt into . .

MECHANIZED



This line of 15 molding machines is serviced by overhead sand hoppers. Rail mounted carriers at lower right move the finished molds to pouring area and shakeout



Molds are poured from 400-lb capacity, hand-pushed ladles on overhead monorails

Molds are spilled to hooded oscillating pan conveyor by an automatic tipping device

OPERATION

By ROBERT H. HERRMANN
Associate Editor

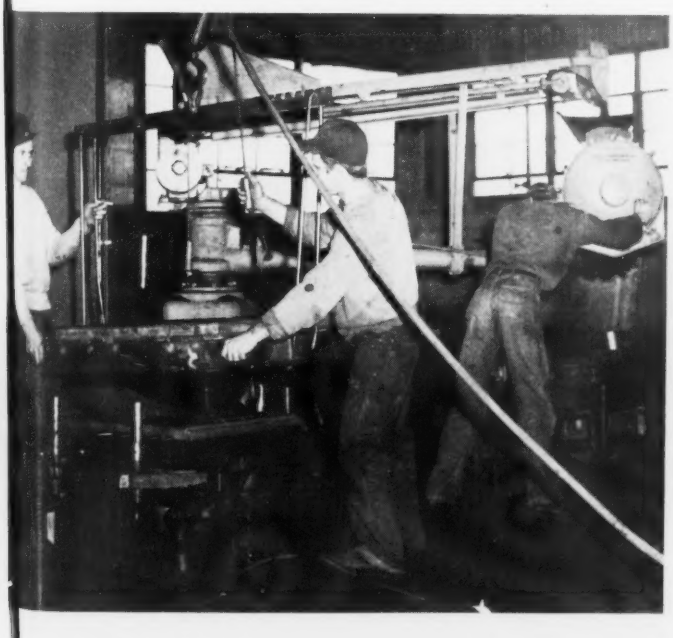
BURNED to the ground in 1950 after forty years of operation, Auburn Foundry Inc., Auburn, Ind., was rebuilt and re-equipped along modern, mechanized lines and has been in operation a little over a year. The new building is of all-metal construction with concrete floors throughout. Floor in the cleaning room and shipping area is reinforced with surface steel plates.

Although no patterns stored in a separate fireproof room were lost in the fire, the foundry did lose practically all of its customers during the two-year period of reconstruction. Many of the old customers have returned, and much new business has been added under the capable leadership of two young men, Richard Fink and Donald E. Kastner.

Currently pouring 50 to 60 tons of gray iron daily, the shop is engaged in jobbing operations, producing castings weighing from a few pounds to 275 lb. Production is on a one-shift, 8-hr, 5-day basis, and employment totals 120, including officers, office personnel and production employees. Thus Auburn might be considered small. Yet it is a highly mechanized operation, pours a sizable tonnage and is highly regarded in the Middle West for quality castings.

Foundry operations are housed in a long, rectangular building. The cleaning department is at one end, separated from the machine molding section by a molding sand muller, shakeout and ascending and descending conveyors. Beyond the muller is a row of 15 molding machines with mold set-off and pouring conveyors extending behind them across the room. These conveyors terminate at a below-floor-level, hooded and vented oscillating pan conveyor. Beyond this mold dump conveyor is an aisle, and on the far side of the aisle, about midway the length of the conveyorized pouring area, are two cupolas set flush with the wall of the main building in a small, built-out bay.

Cope is being removed from portable pin lift machine. Molds are rammed with a sandslinger



On the other side of the room, beyond the line of molding machines, is an areaway, providing an aisle adjacent to the line of molding machines and storage space between the aisle and building wall for flasks and patterns scheduled for current use. At the end of this aisle is a stationary sandslinger for ramming larger work. Extending from the slinger across the room is an open area where the large molds are set out for pouring and breaking out. Beyond this on the same side of the building on which the cupolas are located is a bay housing the coreroom. The fireproof pattern storage room is in the corner of the main building beyond the sandslinger. Next to this is a storage area for miscellaneous supplies, and in the other corner is the pattern shop and general equipment repair area.

The one-ton capacity muller for preparing molding sand is serviced by two 60-ton overhead sand storage bins. Pneumatically operated gates drop sand into a bottom gated batch hopper, which also is opened pneumatically to discharge into the muller. A fan blows cooling air into the muller as sand falls in and is mixed. Various amounts of water, western and southern bentonite and seacoal are added, depending upon sand temperature and the sand characteristics desired for the type of work being done.

Mixing sequence calls first for metering water into the muller, then dropping the sand and finally adding the bentonites and seacoal by hand. Mulling time is 1 minute. Moisture is held between 3 and 5 per cent. Mulling operations are performed by one man on a platform about 8-ft high around the muller.

Mulled sand is discharged into a floor level hopper which feeds an underfloor belt, carrying sand to a bucket elevator. The elevator discharges the sand to a 138-ft-long overhead distribution belt from which sand is plowed off into molder's hoppers. There is a catwalk along this conveyor from which a man raises and lowers the plows to keep the hoppers filled. A plow near the end of the distribution belt deflects sand to another belt about 20-25 ft long, supplying the sandslinger. Sand falls

off the end of this belt through a chute to a plate feeder bin. The plate feeder supplies sand to a bucket elevator which feeds the slinger.

The machine molding area is equipped with eleven jolt squeeze machines, three jolt squeeze pin lift strippers and one jolt squeeze rollover machine. Molds are prepared in wood or metal snap flasks ranging in size from 14 x 20 to 30 x 30 in. First and second machines on the line, a pin lift and a rollover, respectively, are worked as a team. In front of the first machine is a short roller conveyor, curved in the direction of the second machine. Drags are rolled out on it to receive the copes made by the second machine. The third and fourth machines, both pin lifts, also are operated as a team, one making drags and the other copes. These four machines handle the larger flask sizes. Matchplate work in smaller sized flasks is handled by the balance of the machines.

Molds Are Placed on Carrier

Finished molds are placed with their bottom boards on wheel-equipped mold carriers which ride on angle iron rails mounted on a cement-brick covered metal platform about 2 ft above floor level. Molds are lifted from the machines to the mold carriers by hand or by an air hoist suspended from a bridge crane. The carriers are of welded metal construction 20 in. wide and 60 in. long with ball-bearing skate wheels, and are designed to carry from two to four molds, depending upon size. Rails extend 60 ft from molding machines to oscillating conveyor, the pouring and cooling area being in between.

When a molder has loaded a carrier with molds, he gives it a push along the rails toward the pouring area. Then he releases a hand catch which permits a short section of the track at the end of the upper rail section to pivot downward by gravity to align with another track directly beneath that which carries the loaded carriers. Carriers, carrying bottom boards, are returned from the mold discharge point to the molder on this lower track. The molder reaches down and rolls one of the mold carriers onto the movable track section.

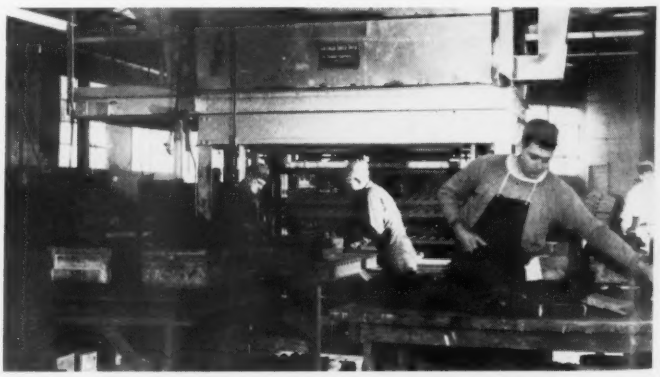
Because this movable section, which is about 24 in. wide, is pivoted approximately 8 in. from the back edge, the molder merely presses down on the back edge, holding the carrier in place, and the lever action raises the track section and the carrier to alignment with the upper rails and is locked in place by the catch. Metal stops at the ends of the lower rails prevent the straddle boards from rolling off the track when the pivoted section is in the up position. Carriers must be pulled over these stops onto the movable track section.

All molds are jacketed and weighted for pouring. Unused jackets and weights are stored on shelves erected above the mold carrier tracks just behind the molders. Metal is transported from cupolas to pouring area and the molds poured from 400-lb, hand-pushed ladles suspended from overhead monorails.

The monorail system consists of a fixed loop, with one side passing in front of the cupolas and the other over the discharge ends of the mold-carrying tracks. Switches in this side permit ladles to be rolled onto movable monorail sections which carry the ladles over all the mold-carrying rails in the pouring area. A monorail extension of the main loop carries ladles to the slinger floor where movable rails, which traverse the entire slinger area, align with the main monorail to receive the ladles.

When molds in the squeezer area have cooled, the carriers on which they ride are pushed to the ends of the tracks where they roll down a short incline onto a pivoted section of track. As the carrier strikes a stop at the end of the track, the sand and castings fall off into the 117-ft-long oscillating pan conveyor. Bottom boards are held on the carriers by a raised edge on the forward end. When the carrier strikes the ends of the track, it simultaneously trips a lever to release a catch holding the pivoted track section, which is so balanced that after the weight of sand and castings has been removed it tips back to align with the lower track, and the carriers roll back to the molders. With the weight of the carrier gone the pivoted section tilts upward again to align with the upper track where it is held in position by the catch, ready to receive the next loaded carrier.

Cores from machines and benches are carried to the tower oven on a slider conveyor belt



Baked cores are moved from oven to rubbing and pasting operations on a roller conveyor

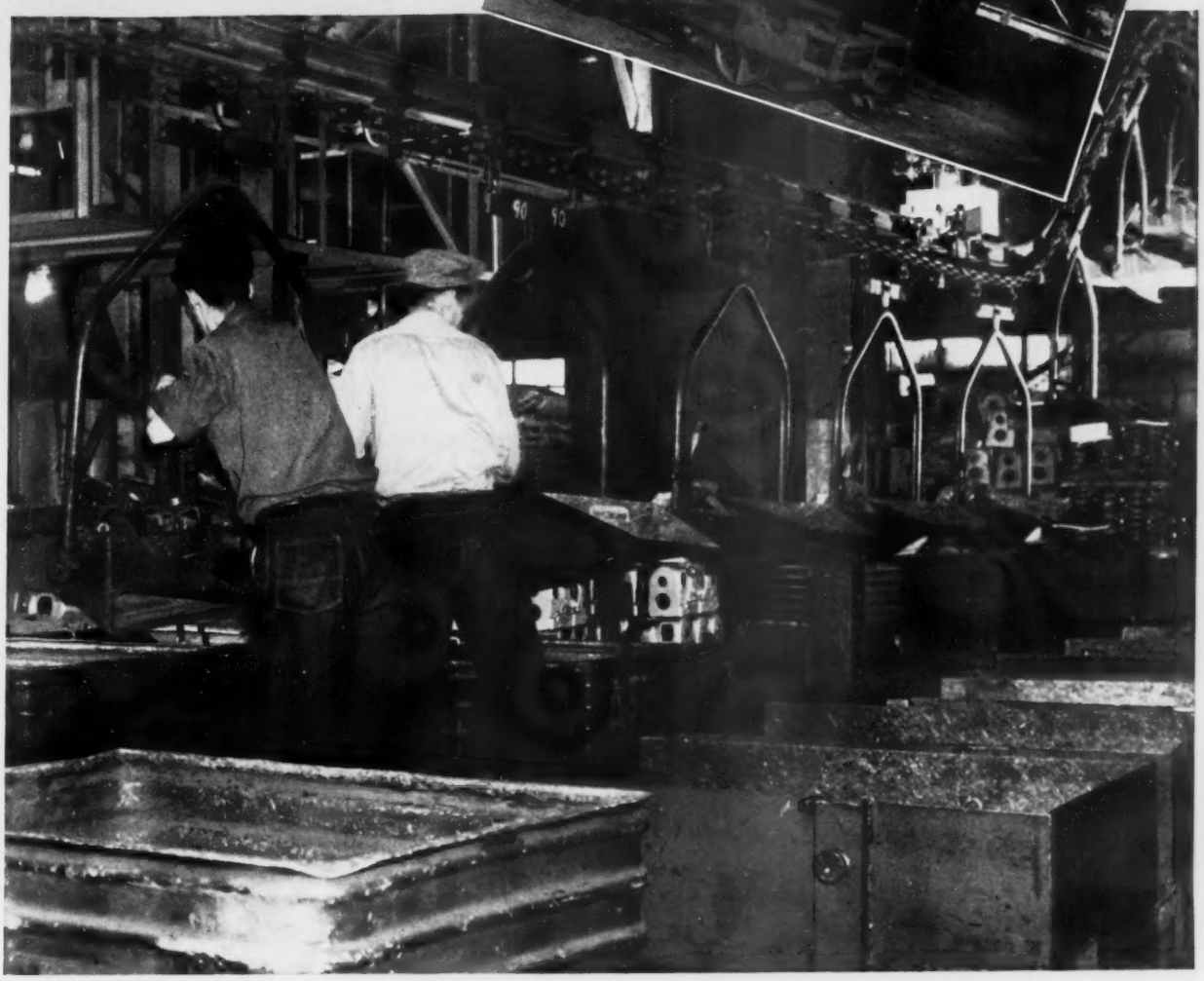
Molds in the slinger section are rammed on the floor or on two portable pin lift machines. Bridge cranes equipped with pneumatic hoists are used to position the machines under the slinger, to close molds and to move them away from the slinger to the pouring area. The hoists also assist in breaking out the castings on the floor. Castings are taken to the cleaning room by an electric platform truck. Sand and gating metal which has been knocked off the casting with a sledge hammer is scooped off the floor with a front end loader truck and dumped into the oscillating pan conveyor just behind the new sand feeder.

New molding sand (Juniata bank sand) is added to the system from an open-top bin located at the tail end of the oscillating pan conveyor. The bin

Castings are hooked off the shakeout to pans on an overhead chain conveyor

A tote box load of castings is dumped into a centrifugal blast, tumble unit

Two men unload and sort castings from cooling conveyor into the tote boxes



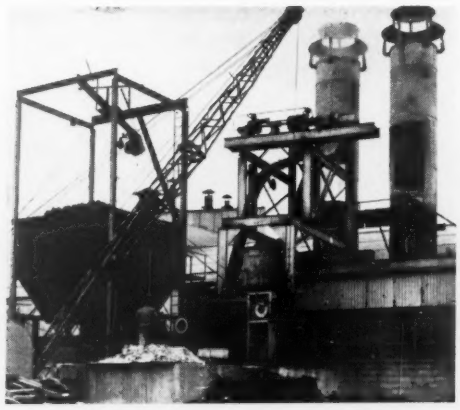
is filled by the front end loader, and the sand flows out the bottom through an adjustable slot opening to form a thin ribbon on the oscillating conveyor. About 4 tons of sand is added daily, the exact amount depending upon the number of cores being used in current work.

The oscillating conveyor feeds onto a vibrating, hooded shakeout located in an open pit below floor level. Two men stand at the discharge end of the shakeout and hook castings off to 3 x 4-ft, three-sided pans carried by an overhead monorail chain conveyor. This conveyor is 600 ft long, has 100 pans, travels at 200 ft per hr, and its purpose is to cool the castings. The conveyor travels up from the pit and out through an opening near the ridge of the gable roof. Outside the building the conveyor makes a 90-degree turn to travel along the ridge of the roof over the casting cleaning section.

The conveyor is protected from the weather during its outside travel by a narrow metal roof. At the end of the building, the conveyor makes another 90-degree turn and re-enters the building, descending along the inside of the end wall. At the side wall it turns again, continuing its descent until the pans are about 5 ft off the floor. Then it turns again to travel across the width of the building, passing close to the molding sand muller as it does so. Two workers are stationed along the conveyor to remove and sort the castings.

Auburn Foundry Uses Mobile Yard Cranes for

METAL HANDLING and CHARGING



Charge make-up center, showing concrete abutment around weigh bucket, coke hopper and charger

OUTSIDE storage area at Auburn Foundry Inc. is divided into two main sections. The long-term, reserve storage yard is located at one end of the main building and comprises a triangular shaped plot of ground filled with several piles of scrap segregated according to type. The active storage and charging yard is at the back of the building immediately behind the cupolas.

Handling of all metals in both yards is done by two 10-ton capacity, dual pneumatic-tired, four-wheel, self-propelled cranes, equipped with 36-in.-diam magnets. One of the cranes has a 30-ft boom and the other a 35-ft boom. Both have three forward and three reverse speeds with maximum travel of 12 mph. They are equipped with gasoline engines for driving the wheels and moving the cab and boom. A separate gasoline engine-generator set supplies electrical current to the lifting magnet.

One of the cranes is used exclusively for making up cupola charges. It is stationed at one spot, and, because of its long boom, can cover the greater part of the yard in gathering the charge. Skip hoist cupola charging equipment is used. Hoist tracks are pivoted at the base, the upper end being equipped with wheels which ride on a monorail, permitting the track to be moved in front of the charging door on either cupola.

Lower end of the track carries the charging bucket into a pit in the ground under a drop-bottom make-up bucket in which charges are weighed. Scale dial is mounted on a post, easily visible to the crane operator.

Materials are delivered to the yard principally in railroad car, although occasional deliveries are made in trucks. Metal is unloaded by one of the yard cranes either to the charging yard or to a dump truck which hauls it to the reserve storage yard. Coke is unloaded by a portable belt car unloader which fits under a drop bottom gondola car and feeds an inclined distributing belt conveyor which piles the coke on the ground. A front end loader truck scoops it from the pile and dumps it into a drop-bottom bucket suspended from an electric hoist. The hoist is propelled horizontally along an overhead monorail mounted on a gantry which straddles a storage hopper. When the

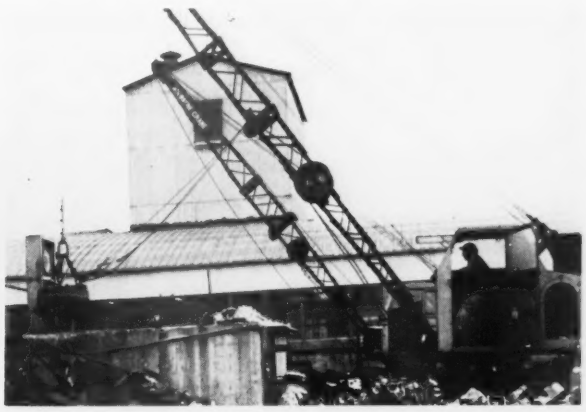
Just after the castings are removed, the conveyor passes through an automatic lubricating device which greases each wheel individually. The conveyor continues to the far side of the building, then turns again before descending into the shakeout pit.

Hammers are used to knock off gates and risers not previously removed from castings at the shakeout. Gating metal is tossed into metal skid boxes and hauled to metal storage by fork truck. Castings are thrown into metal tote boxes set on wheeled carriages. They are wheeled by hand to one of two centrifugal blast, tumble units or a rotating table, centrifugal blast cabinet.

These tote boxes are about 3 x 4 ft and are open at one end. Metal rings mounted at the sides about 18 in. from the closed end are hooked by a bail fastened to the cable of a monorail-suspended pneumatic hoist. A length of chain fastened to the top of the bail is hooked into another ring mounted on one side of the box near the open end to prevent the box from tipping when it is lifted off the wheeled carriage.

Castings are dumped from these boxes into the tumble-blast units by placing the open end of the box into the cleaning machine opening. The short length of chain is unhooked, and the back of the box is raised by the air hoist to allow the castings to slide into the machine. Castings are loaded by hand onto the (*Please turn to page* 227)

One of the 10-ton capacity, self-propelled yard cranes equipped with a 36-in.-diam magnet is shown unloading pig iron from a car



Mobile crane in the foreground is dropping scrap into the weigh bucket during make-up operations. Scale is visible behind magnet

bucket is filled it is lifted to the carrier which then transports it over the carload-capacity hopper. The bucket is lowered to the level of the coke in the hopper before the bottom is dropped in order to reduce coke breakage.

The coke storage hopper is open on the bottom but coke is kept from falling out by a horizontal slat conveyor. When coke is desired for the charge, the electrically driven slat conveyor is started; fines fall between the slats and the larger coke is deposited in a hand wheelbarrow resting on a platform just below the head of the conveyor. Coke then is wheeled to the make-up bucket and dropped in.

Dry sand is delivered in drop-bottom cars and unloaded by the portable belt unloader to a bucket elevator which feeds two chutes above the twin storage silos. Limestone is received either in dump truck or gondola rail cars; in the latter instance it is unloaded by the crane equipped with clamshell bucket. The front end loader moves small amounts of stone periodically from the storage pile to the edge of the make-up bucket. It is shoveled onto the charges.

Total weight of cupola charges is 1500 lb, made up of 30 per cent pig iron, 30 per cent foundry returns, 20 per cent iron scrap and 20 per cent steel scrap. When the charge has been completed in the make-up bucket, the bottom is opened to drop the contents into the charge bucket. An electrically driven cable hoist then pulls the bucket up the tracks into the charging door. Bottom of the bucket is hinged on one side, the catch being released when it hits a striker plate mounted on the cupola wall.

When metal is to be moved from the storage yard one of the cranes is driven to the area where it loads a dump truck used to transport the scrap to the charging yard. Other uses for the cranes when equipped with hook or clamshell bucket instead of the magnet include the moving or unloading of heavy machinery and equipment and the unloading of coal. The cranes were particularly useful in cleaning up debris after the fire and in handling building materials and setting structural steel during the period of reconstruction when the new foundry building was being erected.

Common Sense in Cores

The best core is the cheapest core that will produce an accurately controlled cavity in a casting. New approaches to coremaking are always desirable, but we also must be sure current methods are efficient

By WARNER B. BISHOP
Manager
Foundry Products Division
Archer-Daniels-Midland Co., Cleveland

THE YEARS since World War II have produced a variety of new approaches to the casting of metals. In molding, these have included the use of frozen mercury, high-pressure molding, the Croning process of shell molding, the Dietert process of shell molding, foolproof sands and others.

In the coreroom we have unprecedented mechanization, high-speed blowers capable of producing as many as 350 cores per hour, dielectric baking, synthetic resins, fast-baking core oils, binders which cure by the injection of gas, air-setting binders which require no heat, heated coreboxes and a galaxy of other innovations.

These approaches reflect an awareness on the part of foundrymen of the necessity for effective competition with other forms of metal fabrication. They also reflect the advent of a new generation of engineering talent into our industry, open-minded men who recognize that habit and tradition are not always a sound basis for future efficient production. This is a healthy condition, one which we must encourage and in which we justly can take pride.

We must be careful, however, in our quest for new approaches not to permit daily production inefficiency and waste today. We owe it to ourselves to keep a wary eye on our current, day-to-day operations and to be certain that we are doing the best we possibly can with them. After all, it is today's efficient operation which will provide the money to investigate tomorrow's new process.

What Does It Cost?—Confining these comments to the coreroom and specifically to core mixes, the writer believes it true that we have been swamped by considerations of the novel and the spectacular while often ignoring one basic principle: *A core is a problem in economics.* Its function is to produce an accurately controlled cavity in a casting. It is not made to last through the ages. The best core is the cheapest core that will perform its desired function and no more.

The problem has two aspects: 1. Producing cores that will do the prescribed job. 2. Producing cores as economically as possible without wasted overhead, machinery, materials, time, or labor.

It is very well to derive pride from gleaming equipment and from use of advanced methods or materials. However, if our competitor is making that cavity in his casting in a less expensive manner, we are second best. In a competitive economy, this means trouble.

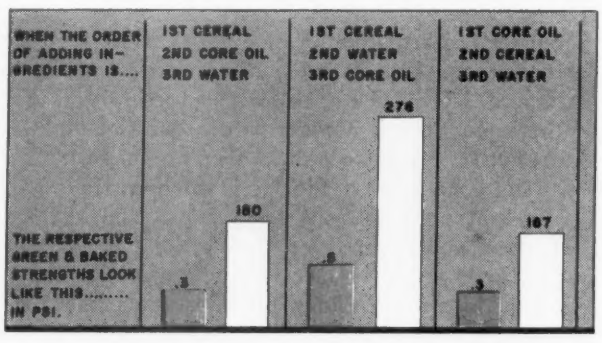


Fig. 1—These mixes received one minute of mixing time after addition of each of three ingredients

Observations in laboratories and in production foundries throughout the country have led me to believe that the greatest immediate economies and efficiencies that can be realized today, at once, in the corerooms of America, lie not in new materials or processes, but in control and refinement of presently used methods. Simple, every-day negligence in our present methods daily adds as much as 20 to 60 per cent to the cost of our core materials.

Core practice and materials still vary widely

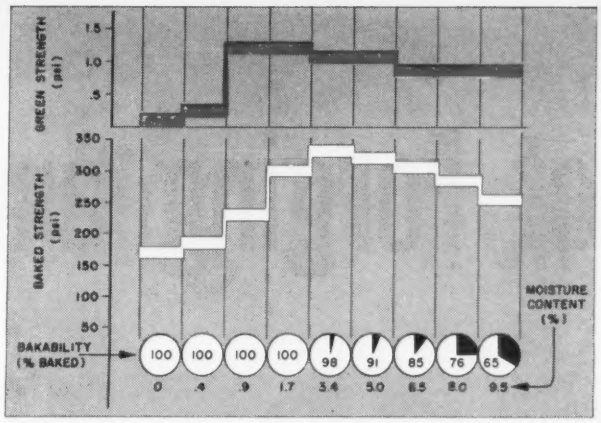


Fig. 2—Cores used in above tests contain lake sand of AFS fineness 52, 1 per cent cereal, 0 to 9.5 per cent water and 1 per cent core oil. Baking cycle employed is 75 minutes, at 475°F

throughout the United States. It is fair to say that usable cores can be made from almost anything. They are so made. However, it also is fair to say that, regardless of materials, observance of controlled care and caution will reduce costs concretely.

Ninety per cent of the tonnage of cores in the United States today is made of sand, cereal, water and core oil. Other additives are used to provide hot strength, flowability, collapsibility, etc., but the basic American core mix usually contains the above four items. To keep this paper as wide in its application as possible, I merely will illustrate the great differences in efficiency and economy which can result from variations in use of these four materials—materials of any given source or manufacture.

Watch These Factors—Close control of four factors in the coreroom can cut the cost of core materials considerably. These four factors are measurement, mixing, moisture, and baking time and temperature. They will be discussed in order.

Measurement of materials is a great source of human error. Although foundries are gradually becoming aware of the importance of measurement by weight rather than by volume, most probably still do depend upon volumetric measurements in actual practice.

It is no secret that sands vary in weight per volume, depending upon grain size, grain distribution and whether they are wet or dry. Other dry compounds such as bentonite, clays, etc., vary in density. Cereal binders are among the most troublesome in this respect. Although they are divided roughly into heavyweight and lightweight grinds, the density of cereal does vary from manufacturer to manufacturer and, despite even the most sincere efforts on the part of a given manufacturer, from shipment to shipment. What is a quart of cereal? If the can is rapped once or twice, twice as much can often be stuffed in.

Core oils vary from grade to grade in specific gravity. The weight per gallon of a core oil varies with temperature. As unfamiliar as the idea may be to many foundrymen, the only accurate way of measuring core oil is by the pound, since a pound is always a pound, regardless of density, specific gravity or temperature.

Measuring cans and buckets have a way of becoming bent, and their volume is thus varied. There is a difference between a heaping quart and a level quart. There is a difference between a wheelbarrowful in the morning when the worker is fresh and full of energy and in the evening when he's tired and has his eye on the clock. All told, volume measurements in the coreroom are too dependent upon human frailties and judgment. They are unwittingly haphazard and the source of much error —which spells expense. Though costly to install, scales for weight measurements will pay for themselves rapidly in materials saved, freedom from faulty mixes and the elimination of scrapped castings.

Almost every new method of molding or coremaking offered to the foundry requires accurate weight measurement of materials. Why not install scales and take advantage today of the savings possible in our present practice?

Fig. 1 indicates the vast differences in physical properties, both green and baked, which occur in a core mix solely because of the sequence in which materials are added to the mixer. Using 1 per cent core oil (by weight, as are all measurements in this paper), 1 per cent cereal binder, 2 per cent water, and mixing one minute after addition of each ingredient, for a total of three minutes in a muller-type mixer, we obtain the results shown in Fig. 1.

It becomes obvious from these figures that the best sequence is first cereal, second water, and then oil. Equally as good, though not shown, is water first, cereal second and then oil. The main point here is to get the water and cereal into the mix one after the other, before the oil has been added. Thus the oil cannot waterproof the cereal, and the water will have adequate opportunity to mix with the cereal thoroughly and to form the optimum paste which this cereal is capable of producing.

These figures divulge (*Please turn to page* 241)

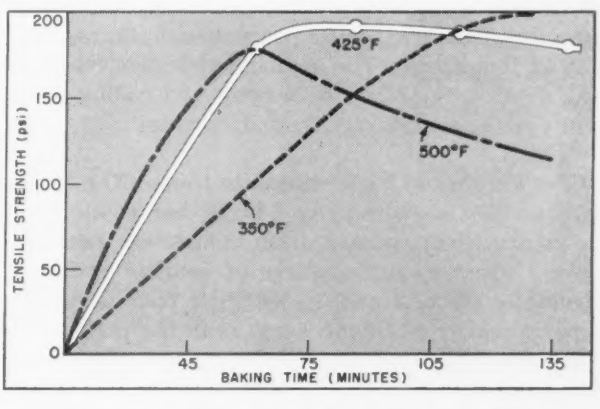
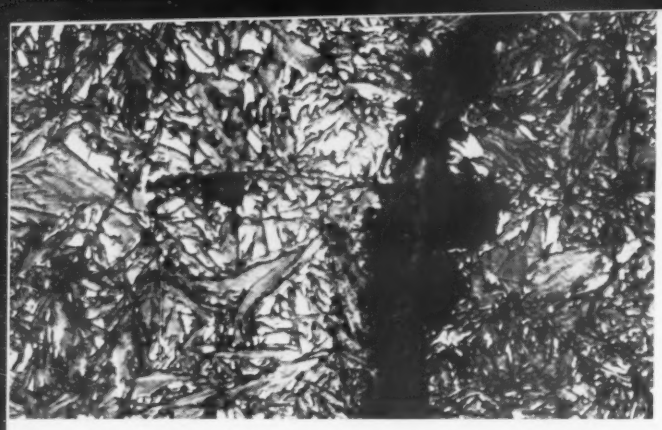
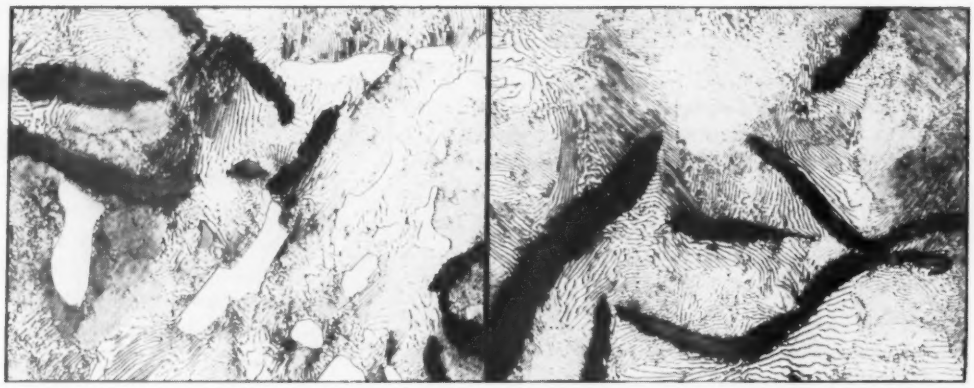


Fig. 3—This chart shows the effect of baking time and temperature on core tensile strengths



Hot Forging and

Fig. 1—Iron ball was drop forged at 1700°F, oil quenched and drawn to 509 brinell. X1000



Figs. 2 and 3—At X600, bar No. 3 shows the etched structures near the corner that generally are typical of the softer 2-in.-square cast bar

THE HOT working of iron castings has received little attention in the technical literature, and little is known either about the conditions under which the irons can be hot worked or of the property characteristics which may be developed.

An investigation has been conducted on Meehanite castings, however, and hot forging has actually been used with cast Meehanite balls which have successfully replaced steel balls in certain ball mills. The balls were drop forged after heating to 1700° F, quenched in water and drawn at 375° F for 40 minutes.

In hot working studies, two series of tests were conducted. The first series related to the behavior of flake graphite irons, forged at temperatures ranging from 1650° to 1880° F with reduction in section of about 50 per cent. Data were obtained on microstructure, tensile properties, hardness and impact toughness. The second series provides similar data on the effect of forging and rolling mottled irons containing limited amounts of free graphite.

Hot Forging of Flake Graphite Irons—Three different irons were cast as 2-in.-sq bar stock with microstructures ranging from completely pearlitic (No. 1) to varying mixtures of pearlite and free cementite (Nos. 2 and 3) with the free cementite largely restricted to the areas near the corners of the bars, in the softer (No. 3) of these two irons. Thus the etched structures of these irons containing some free carbides are shown in Figs. 2 to 5.

The main factors involved in reaction to forging are temperature of the casting, weight of hammer blow, method of deforming the square bar under the hammer, and structural changes occurring during repeated heating.

A 400-lb air hammer was used, and it was observed that about one-half the maximum energy of the hammer could be successfully employed by taking "nips" as the bars were fed progressively across the face of the hammer on one face of the ingot. The ingot was then turned through 90 degrees and similarly forged before reheating. Light blows were also made on the corners of the bars to assist in prevention of surface checking. This method resulted in about 5 to 8 per cent elongation between successive reheatings.

Preliminary tests of heating for one hour and for 24 hours at 1500° and at 1800° F demonstrated that the bars were microstructurally stable at forging temperatures. As the forging temperature was raised from 1650° to 1930° F less energy was required for similar amounts of deformation, using elongation as an index. Despite light corner forging after each successive 5 to 8 per cent reduction and reheating, it was difficult to entirely eliminate surface checking, although the surface cracking observed was limited as regards penetration.

Sections of three different casts showed comparable structural changes at the different forging temperatures. Macrostructures from No. 3 show typical examples of graphite refinement (Fig. 6) after about 50 per cent reduction at 1650° and 1800° F, respectively. After final forging the bars

By C. R. AUSTIN
Assistant to President
Meehanite Metal Corp.
New Rochelle, N. Y.

Rolling of Iron Castings

Figs. 4 and 5—At X600, bar No. 2 shows the etched strctures near the corner that generally are typical of the harder 2-in.-square cast bar

were normalized from forging temperature prior to being subjected to tensile testing and metallographic examination.

Reproductions of the appearance of polished sections photographed at the more conventional magnification of 100 diameters (Fig. 11) also reveal graphite refinement dependent on both the forging, operation per se, as well as on the temperature at which the forging is conducted.

For the tensile data a 60,000-lb hydraulic machine was used on standard ASTM threaded-end bars machined to 0.8-in. diam over 1-in. length, using an extensometer sensitive to 2 x 10^{6} inches for determining elastic modulus values, and a pair of telescope micrometers, working on the cathetometer principle, to provide data of the complete stress-strain curves. The extensometers are only practical to determine accurately the true stress-strain characteristics to a little beyond the limit of proportionality. The data obtained on tensile strength and brinell hardness are condensed in Table I.

A few data were also obtained to define the effects of forging on the impact properties of the irons. Unnotched 15-mm-sq bars were tested in a Charpy machine with a knife edge distance of 60 mm.

Mean values obtained on bar No. 1 were: As cast —14 ft lb; forged 60 per cent at 1930° F—34 ft lb.

The stress-strain curves to fracture for iron No. 1 in the cast condition and after forging to 50 per cent reductions at 1650° F are reproduced in Fig. 7.

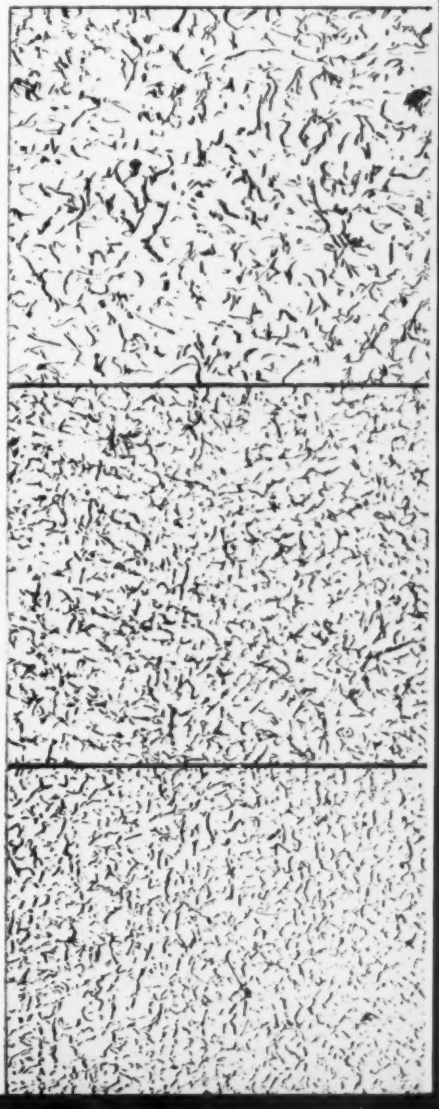


Fig. 6 — Effect of forging on graphite flake size and distribution of bar No. 3. Recorded at X25

Bar No. 3 as cast

Forged 50 per cent reduction at 1650°F

Forged 55 per cent reduction at 1800°F

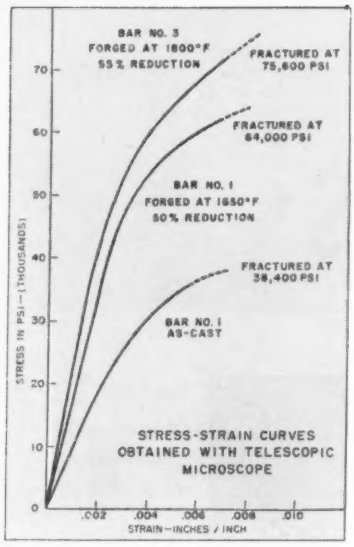


Fig. 7—Effect of forging on stress-strain behavior of pearlitic iron (1) and of mottled iron (3)

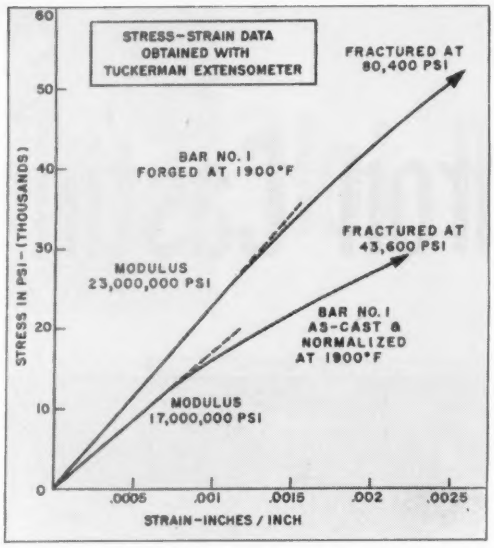


Fig. 8—This chart shows the effect of forging on the modulus of elasticity of pearlitic iron No. 1

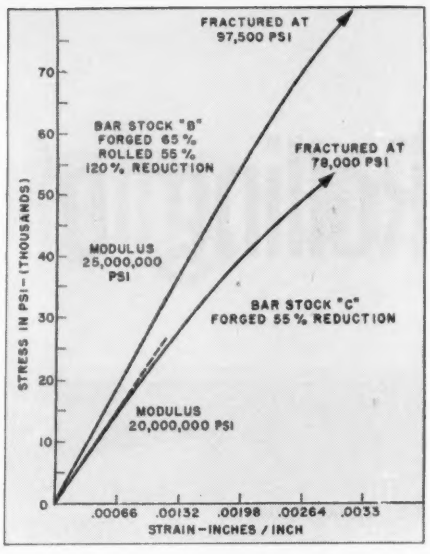


Fig. 9—Effect of forging and rolling at 1900°F on tensile and modulus of irons with free carbides

Fig. 11—Effect of forging on graphite refinement of bar 3 at X100. Left, as cast; center, forged at 50% reduction at 1650°F; right, forged at 55% reduction at 1800°F

This figure also includes the curve for bar No. 3 forged at 1800° F to 55 per cent reduction in area. Examples of curves used to define elastic modulus are shown in Fig. 8.

Referring to these figures it may be observed that increasing the forging temperature of the pearlitic bar No. 1 from 1650° to 1900° F raised the tensile strength from 64,000 to 80,400 psi. The modulus of elasticity was raised from 17,000,000 in the cast condition, to 23,000,000 psi by hot working at 1900° F. The effect of forging on fragmentation of carbides was observed in the polished and etched structures (Fig. 12).

Fig. 8 illustrates a limited range of data plotted to a stress just beyond the limit of proportionality, using the Tuckerman extensometers, for Bar No. 1 as cast, and after forging at 1900° F. The complete freedom of scatter of the data obtained by this method is noteworthy, and a true modulus of elasticity was calculated for several of the forgings as listed in Table II.

It has been shown clearly that values for tensile strength, elastic modulus, proportional limit and yield strength of these irons can be raised to a noteworthy degree by hot working. The hardness was not materially affected but the tensile strength was more than doubled by the forging treatment.

Both high forging temperature and heavy reductions in cross section react favorably toward the development of optimum physical properties, and tensiles of well over 80,000 psi can be obtained, in association with increased elastic modulus and yield strength, and with high impact properties.

Mottled Irons—The previously discussed study was extended to two mottled irons (Bars A and B) containing considerable free carbide and relatively small amounts of dispersed graphite cast to 415 brinell hardness in 1½-in.-sq section. A regular Meehanite type "GA" engineering iron (Bar C) of about 250 brinell hardness was also included, for purposes of comparison, cast in 1 x 1½-in. section.

The general procedure adopted was to soak the bars for 30 minutes at 1900° F, lightly forged, then reheated and again forged. Using increased length of the bar stock as an index of reduction, the forging was continued until results indicated in Table III were obtained.

After forging, the bars were pickled in an aqueous solution containing 10 per cent hydrochloric

TABLE III—Reduction by Forging

Material Bar	Number of Reheatings	Percent Reduction	Bhn
A	14	128	331
B	5	25	415
B	7	50	388
B	11	72	375
C	5	50	...

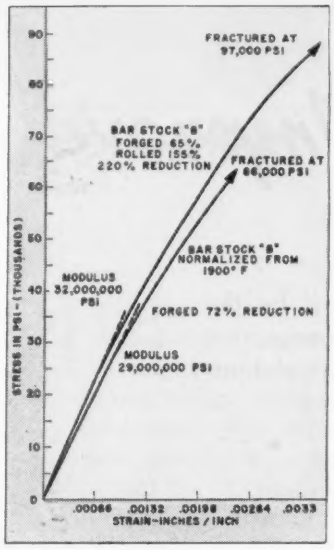

FRACTURED AT 97,000 PSI
BAR STOCK "B" FORGED 65% ROLLED 155% 220% REDUCTION
FRACTURED AT 86,000 PSI
BAR STOCK "B" NORMALIZED FROM 1900° F
MODULUS 32,000,000 PSI
FORGED 72% REDUCTION
MODULUS 29,000,000 PSI
STRESS IN PSI - (THOUSANDS)
STRAIN-INCHES / INCH

Fig. 10—This chart represents effect at temperature of 1900°F of heavier reductions of bar "B"

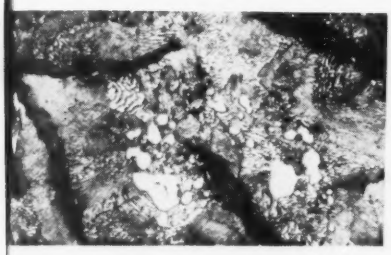


Fig. 12 (left)—Fragmentation of carbides in bar No. 2 after forging to 50 per cent reduction at 1900°F, shown at X600. Compare Fig. 5

TABLE I—Tensile Strength and Hardness Values

Material, Bar No.	Forging temperature ° F	Reduction in forging percent	Brinell hardness number	*Tensile strength psi
1	"As cast"	None	229	38,400
1	1650	50	212	64,000
2	1650	50	217	66,800
3	1650	50	207	68,600
1	1800	25	235	58,400
2	1800	25	241	56,000
1	1800	50	232	73,200
2	1800	50	217	72,400
3	1800	55	217	75,600
1	1900	55	217	80,400
2	1900	50	235	82,400
3	1900	55	232	63,600
1	1930	60	229	85,000
3	1930	60	241	93,000

*Bars normalized from forging temperature

TABLE II—Modulus of Elasticity of Forgings

Test Bar	Forging temperature ° F	Reduction in forging percent	Tensile strength psi	Proportional limit psi	Yield strength at 0.2% psi	Modulus elasticity psi
1*	"As cast"	..	38,400	.....	36,000	.....
1*	"As cast"	..	43,600	12,000	.....	$17x10^6$
1†	1650**	50	64,400	21,000	.....	$21x10^6$
1†	1800**	50	73,200	26,000	.....	$22x10^6$
1†	1900**	55	80,400	26,000	.....	$23x10^6$
1*	1650	50	64,000	.....	58,000	.....
3*	1800	55	75,600	.....	62,000	.....

*Using telescopic microscopes
†Using Tuckerman extensometer
**Normalized from 1900° F after air cooling from forging temperatures

acid and 4 per cent hydrofluoric acid at about 140° F. The surface of the forgings showed essentially complete absence of surface cracking.

Examination of the structures of the mottled irons (A and B) showed a progressive breakdown of the original massive carbide aggregates as the reduction by forging was increased. This was accompanied by a progressive increase in the amount of nodular temper carbon, but the size of the nodules decreased as the amount of forging was increased.

Rolling of the Forged Bars — Since the hard irons, Bars A and B, responded so satisfactorily to forging, several test bars were subjected to rolling following the initial forging. The bars were rolled in a cogging mill used for regular reduction of small billets so that a progressively smaller square section with rounded corners was obtained in each of the successively smaller grooves.

Preliminary tests on one of the 415 brinell hard irons (Bar A) subjected to both forging and rolling (Table IV) demonstrated the practicability of forging and rolling these irons.

Care was taken to reheat prior to continuation of forging and rolling whenever the temperature dropped from 1900° to about 1700° F. All bars were normalized from 1900° after the final rolling operation.

Tensile Tests—The many series of hot working operations provided material for examination of the effects of hot working on the tensile characteristics of the iron. Tests were made on a 60,000-lb hydraulic machine using a strain gage to follow the stress-strain relationship during applications of the load. These gages are quite sensitive since 0.10 reading on the dial corresponds to 0.000033-in. strain on elongation.

On account of the considerable reduction in bar diameter after hot working, a 2-in. gage of 0.505-in. diam was generally used.

The results of these tests have been summarized in Table V and a few of the stress-strain curves have been reproduced in Figs. 9 and 10.

Referring to Table V and Fig. 9, it will be noted that forging has not resulted in any change in the modulus of engineering Meehanite type "GA", although a tensile strength of 78,000 psi resulted from 55 per cent reduction by hot forging followed by a normalizing treatment.

With the mottled or hard irons, very high tensile values can be developed, especially when the bars are hot forged and (*Please turn to page* 244)

TABLE IV—Hard Iron (Bar A) Subjected to Reduction by Forging and Rolling

Reduction by Forging	Reduction by Rolling	Total Reduction	Bhn
72%	150%	222%	321
128%	150%	278%	301

How Management Can Improve

Effective utilization of modern methods and equipment is limited by the productivity of the working force. This article describes a management program aimed at increasing productivity through good human relations

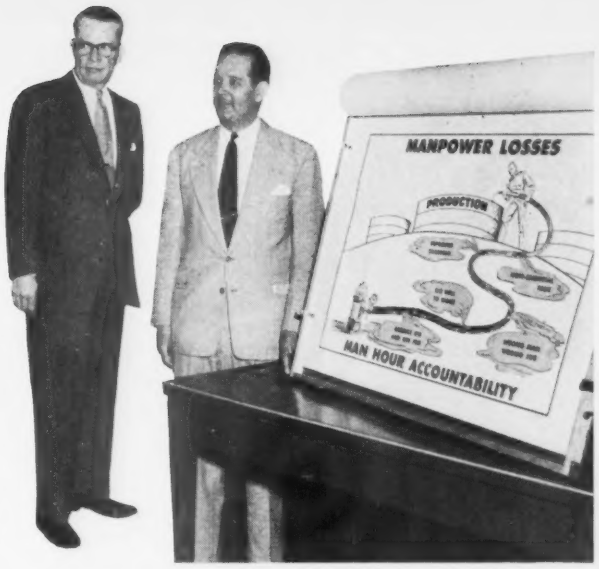
By JACK C. MISKE
Assistant Editor

Certificate of Proficiency
UNITCAST CORPORATION
Presents to
Victor E. Zang
This Certificate in Recognition of his having satisfactorily completed the Unitcast 40 Hour Course in Industrial Supervisory Training
Given at Toledo this 1st day of July 1954
President
Works Manager
Director of Safety and Training

Each graduate of Unitcast Corp.'s management course receives a handsomely inscribed certificate, like the one shown at the left

The management course classes are conducted in a comfortable, informal atmosphere conducive to relaxed discussion. Below is a typical class meeting

Human Relations



Edwin Chittenden and Arthur Shanley, left to right, are creators of the management course

IN A PERIOD when mechanization is playing an increasingly important part in foundry operation, it might be easy to lose sight of a basic fact: Human beings make castings. Until the pushbutton foundry arrives, people will continue to make them, and prudent management will keep in mind the fact that its machines are no more efficient than the men who operate them.

Unitcast Corp., Toledo, O., a producer of steel castings for a variety of products, faced up to this problem immediately after World War II and since then has developed a continuing program for the improvement of human relations which has paid off handsomely. For one thing, at this writing the company has not had a work stoppage since 1945, when the new program started. As that fact would indicate, management and labor are working together in an atmosphere of co-operation and consideration, producing more efficiently than ever before.

A Good Place To Work—The program has many facets, but underlying them all is a sincere desire to create a good place to work, a company where everyone is recognized to be a human being and is treated accordingly. The purpose of this goal is twofold. First, management at Unitcast feels that human relations are desirable in themselves, simply because they are right. Second, it realizes the importance of the fact stated earlier—that castings are made by people. Happy employees are productive employees.

Good human relations are more easily talked about than achieved, however, and the company has worked hard to make them a reality. Its program is a compound of many ingredients, some of them time-tested and at least one of them startlingly different. The primary purpose of this article is to explore the nature of the latter—a management training course aimed at the development of management consciousness.

This course now is helping Unitcast to accomplish its objectives.

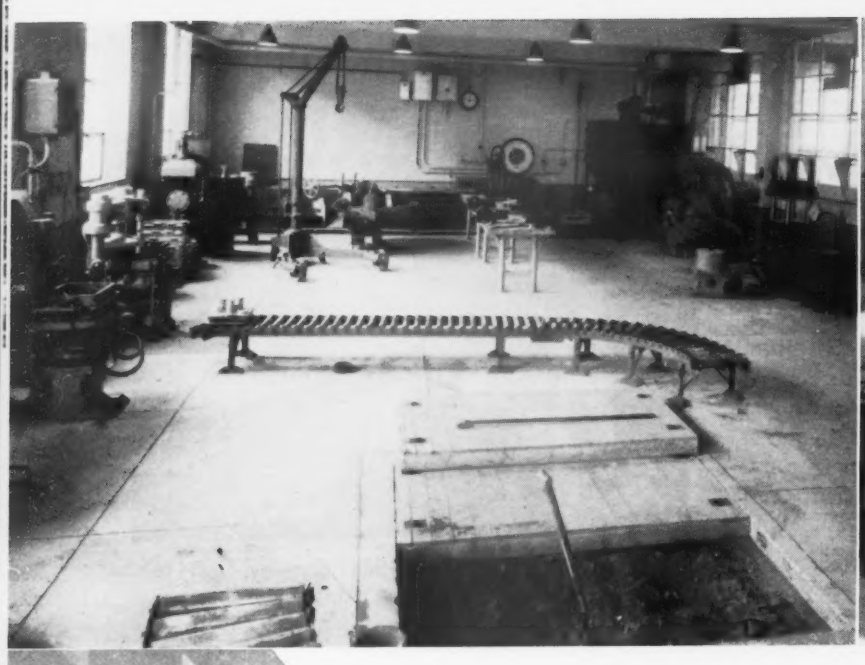
Key men in the development of the course are Edwin F. Chittenden, director of industrial relations, and Arthur R. Shanley, director of safety and training, both of whom are former Air Force men. Mr. Chittenden had a part in the creation of a somewhat similar course in the Air Force, and Mr. Shanley was exposed to it as a part of his own military training. At Unitcast, Mr. Shanley is the instructor of the management classes and has done a great deal of work to amplify the material used and to shape it to fit the company's needs. Third man in the picture is William Miller, director of personnel.

The management course consists of 40 hours of classroom work, broken down into 20 two-hour conference sessions. These sessions take place on company time, in a large, comfortable conference room equipped with a blackboard. One important tool is a set of charts, and another is the material distributed during class meetings and bound for reference at the end of the course.

A rundown of the general subjects covered at the conferences will give some idea of the scope of the instruction and its organization. In order, the conferences are devoted to the following topics: Introduction to leadership and management, which includes management techniques, method improvements and the foundations of personnel relations; principles of organization, including the human factors involved, delegation of authority and span of control; functions of management, which takes in planning, organizing, directing, co-ordinating and controlling to give a clear picture of the structural functions of management (two sessions).

The course continues with work with a project book and a plan for application of methods thus far learned; motion economy and principles of method improvement, with detailed breakdown of job and methods of improvement, plus a collection and analysis of pertinent data; principles, steps and development of methods improvement, as well as the development of methods instruction, with stress on individualistic thinking; use of group and flow process charts, with job breakdowns and the development of a standard operating procedure.

Concluding sessions cover foundations of personnel relations, with emphasis upon individuality, initiative, disciplinary action correctly taken and handling of relations problems; effective utilization of manpower from the standpoints of availability, capacity for production, will to work and essentiality of tasks at hand; manpower losses, taking into consideration work simplification principles, absenteeism, etc.; planning management improvements; and a general summary. (*Please turn to page* 238)



Above views were taken in the experimental foundry of the National Foundry College building, the exterior of which is shown below

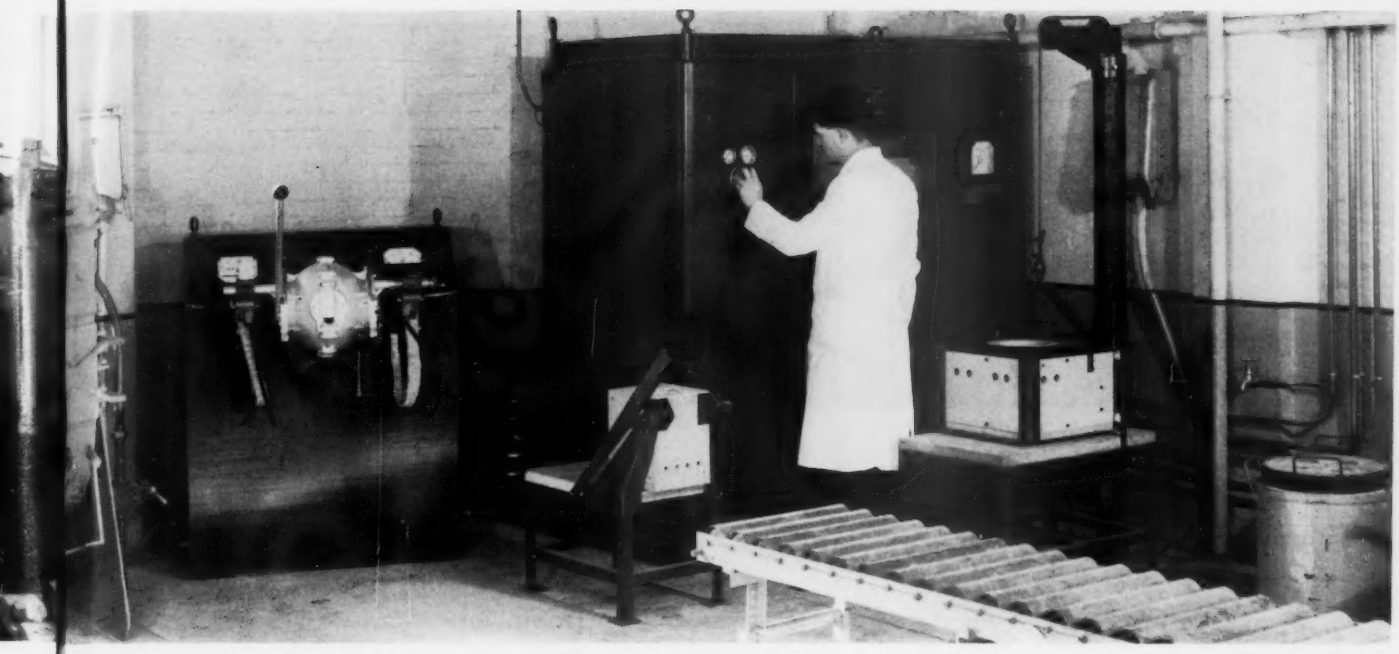
BRITISH FOUNDRY EDUCATION

By J. B. McINTYRE
National Foundry College
Wolverhampton, England

BRITISH foundries are a vital part of industry and their products are indispensable in all domestic and engineering applications. Approximately 6000 foundries are established, and almost a quarter of a million men are employed in all aspects of castings production.

It is surprising that specific provision for foundry education was not made until 20 years ago, but these educational facilities are now well established, and form a valuable contribution to industrial efficiency. British foundry education is now organized in two main sections—craft training and executive training. The scope of foundry operations increases annually, and few foundries are able to provide the range of work which would enable the modern foundry apprentice to master his craft. A limited number of large firms mainly concerned with gray iron castings production have developed apprentice training schemes, which are excellent examples of their kind. Apprentices in the remaining foundries were not always able to obtain a complete training, and in small foundries particularly the training problem was acute.

Some years ago, the Joint Iron Council organized a foundry craft training center in West Bromwich. Students from all parts of the country are now able



Experimental foundry equipment includes electric melting units. Photo by courtesy of Birlec Ltd.

to take a training course lasting four months and divided into four installments, each separated by a nine-months' interval. The craft training course is intended to fill in the gaps which may be present in the training of apprentices employed in the production of a limited range of castings, or a limited range of alloys. Though the training program was originally developed for apprentices in the iron founding industry, other foundry apprentices are also accepted, and a general craft training is given. The course is of a residential nature and adequate hostel accommodation is provided. Craft training is given in a foundry housed within the works of an established company in West Bromwich, Staffordshire.

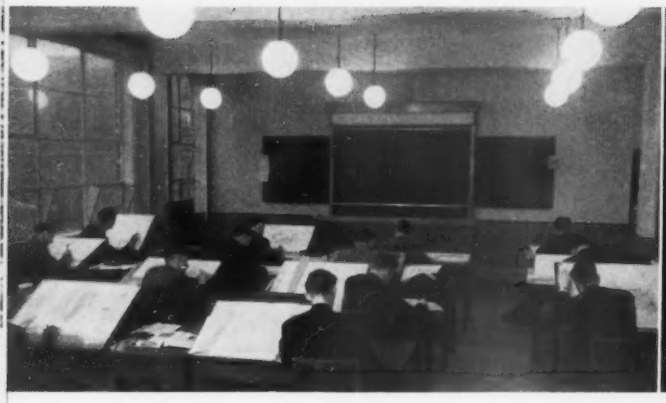
The craft training given during apprenticeship and in the training center can be supplemented by means of part-time study in technical colleges. The qualifications obtained can enable candidates to be considered for entry into the National Foundry College. University graduates are also recruited, after a prescribed minimum of foundry experience has been gained.

The British foundry industry is widely distributed throughout the country and local demands are insufficient to warrant the formation of high-grade training courses. The majority of British universities do not consider technological training to be their province, and few technical colleges are able to provide the necessary facilities for advanced foundry education. In 1934, Dr. J. G. Pearce, director of British Cast Iron Research Association, proposed that an institution devoted entirely to foundry education should be established in a center convenient to the whole industry, and that training at executive level be made available to all personnel of the necessary calibre. One year later, the British Foundry School was opened in Birmingham, and many young foundrymen were trained for the industry; courses of 12 months' duration were established, and proved to be very successful. The school closed down on the outbreak of war in 1939.

During World War II, the need for technological education for all branches of industry was made clear. The Percy Report on higher technological education, which appeared in 1944, proposed that a number of new colleges should be organized to provide specialized training for certain industries which had previously experienced difficulty in obtaining trained personnel. These National Colleges, as they are known, are now well established, and provide potential executives for the aircraft, rubber, horology and foundry industries.

After the recent war, representatives of the foundry industry and of the Ministry of Education decided that formal foundry education should once more be made available, and early in 1948 the National Foundry College was opened. Owing to postwar difficulties in building, the college was accommodated on the premises of the Wolverhampton and Staffordshire Technical College. A diploma course of one-year's duration was originally offered, and one year later a two-year course of a more comprehensive nature was established. The subjects included in the course are intended to provide an inclusive yet specialized training for potential foundry executives.

The extremely varied nature of the British foundry industry makes it imperative that a general training be given which will enable students to apply their knowledge in any type of foundry. Practical work is mainly experimental since experience has shown that the established division between ferrous and nonferrous production methods no longer exists; much common ground exists between the two, and many techniques thought to be of a specialized character can be usefully applied



This class is studying production of castings

Students at work in the sand testing laboratory

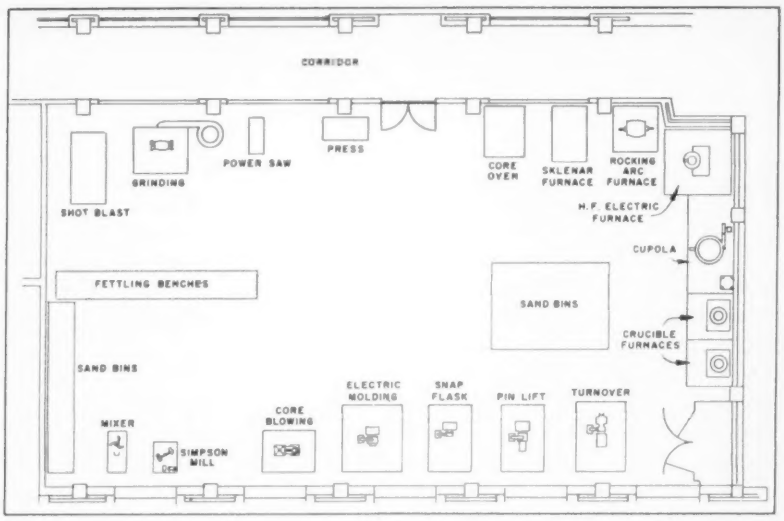


Diagram depicts layout of the college's experimental foundry

At right, student is positioning a casting in the x-ray room

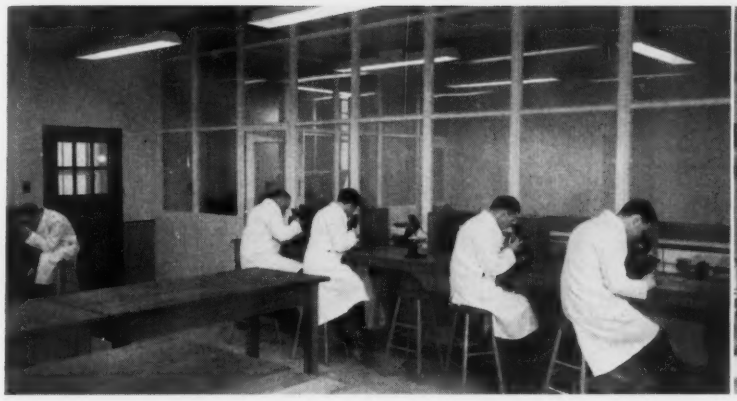
in either or both divisions of the industry.

In the Part I diploma course, management, metallurgy, metallurgical analysis, foundry technology, foundry science and physical testing are included in the curricula. In addition, a substantial amount of time is devoted to the study of projects. The latter are casting studies in which the demands made upon the student are similar to those encountered in the foundry industry. A blueprint is supplied to the student, who is then expected to draw up a complete casting production schedule, including pattern design, selection of running and feeding methods, mold production, sands, alloy selection and melting arrangements, and estimates of production time.

The Part I course occupies six months, and is followed by six months of renewed industrial experience. Part II of the diploma course occupies one year, and the subjects studied include advanced foundry technology, foundry management, projects, and foundry metallurgy. The lectures delivered by the associate lecturers are normally confined to Part II diploma students.

The National Foundry College diploma is awarded to students who complete the Part II course and are successful in the examinations set by the college full time staff. Examination questions and answers are submitted to individuals of high standing in the foundry industry for their approval. Their valuable co-operation helps in the establishment of high standards.

The new premises of the National Foundry College, opened a short time ago, are situated on Stafford street in Wolverhampton, Staffordshire, and form a three-story block specifically designed and equipped for advanced foundry education at a total cost of approximately $400,000. Lectures are given in two large rooms on the top floor of the building; a complete range of visual aids is installed in each, and these rooms are also used for drawing offices. A large heat treating laboratory equipped with a wide range of electrically heated furnaces is situated on the second floor, and extensive facilities are provided in adjacent laboratories for the metallographic examination of cast materials.



This view shows the metallography laboratory

Scene in the metallurgical analysis laboratory

A laboratory equipped for research into foundry problems is also provided; an excellent engineering workshop is installed and is intended for maintenance, test bar production, and for the production of special equipment. Analytical facilities of a most comprehensive character are installed in a laboratory adjoining the main block, while two smaller laboratories for routine analysis and sand control are situated on the ground floor. Pattern-making equipment is housed in the adjacent technical college.

The college foundry is of particular interest and has been designed to enable all foundry techniques to be studied on an experimental basis. No attempt is made to make castings on an industrial scale, but industrial methods are studied closely. It is believed that large-scale production arrangements tend to reduce the flexibility which is essential in experimental work, and much of the melting equipment is, therefore, of small capacity adaptable to the foundry's experimental needs.

Fixed and lift coil high-frequency melting furnaces, and a rocking arc furnace enable steel, nickel-base alloys and similar materials to be melted readily. A notable feature is the 12-in.-diam cupola, designed to allow experiments on blast volume, temperature and oxygen content to be carried out. A tilting air furnace, and two lift out gas-fired crucible furnaces complete the melting equipment.

The molding machines installed are representative of the whole field, and a comparison of mold production techniques can readily be made. Die-casting and centrifugal casting units are also available. Many types of molding sand are required, and the difficulty of furnishing sand supply to molding machines is considerable if the full range of industrial alloys melted is considered. One solution is the provision of several small ground type shovel-out hoppers mounted on light alloy stillages, which can readily be transported to the appropriate machine. A sand pit of generous proportions enables jobbing techniques to be studied in detail. Strickles and other tackle for loam work are available, and adequate facilities for coremaking and blowing are installed.

The handling problem is eased considerably by the use of a mobile jib crane; adequate lengths of roller track are provided, and are moved into position as required. Standard equipment for sand preparation and conditioning is available. Pressure testing equipment is also installed in the foundry. Experimental castings can be rapidly broken up in a 50-ton capacity hydraulic press which is installed in the foundry; the efficiency of running and feeding techniques can quickly be checked in this way without the delay involved in cleaning and fettling.

Fractured surfaces are frequently more revealing than cut surfaces when castings are examined, and the low-power stereoscopic microscopes which are available in the metallography laboratory are valuable for supplementary investigation. A 250-kv x-ray set is installed in the basement, and castings in all commercial alloys can be readily examined.

A full-time lecturing staff of five is maintained, and approximately 50 lecturers from industry and the various research associations deliver lectures of a specialist nature. Very close contact is maintained with industry; lectures and practical work are supplemented by weekly visits to various foundries within a radius of 70 miles of the college. In addition, an annual visit of one week's duration is arranged, so that important plants not normally accessible to the students can be visited. The foundries visited are typical of the whole of British production; large and small plants are examined in equal detail, and no aspect of foundry operation is neglected.

A works visit technique has been developed which enables the maximum amount of information to be obtained. The group of students concerned forms a syndicate, each member of which is expected to obtain detailed information about a single aspect of castings production. All information is pooled and discussed at a subsequent meeting. In this way the wide range of casting production methods in general use can be noted and evaluated; a useful survey of management techniques, and of foundry layout methods can also be made.

Body cores, made on jolt rollover machines, are loaded directly from conveyor to the tower oven

Baked cores, resting on swiveling holders on a car conveyor, are hand-painted with silica wash

Accuracy Is Essential in

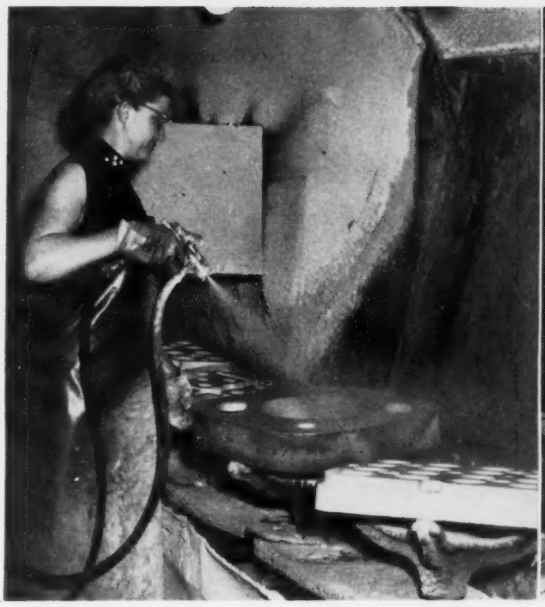
Casting 280

Finished shell is shown at left with a vertically split half at right, showing the cored cavity. The shell is over 49 in. long and 11 in. max diam

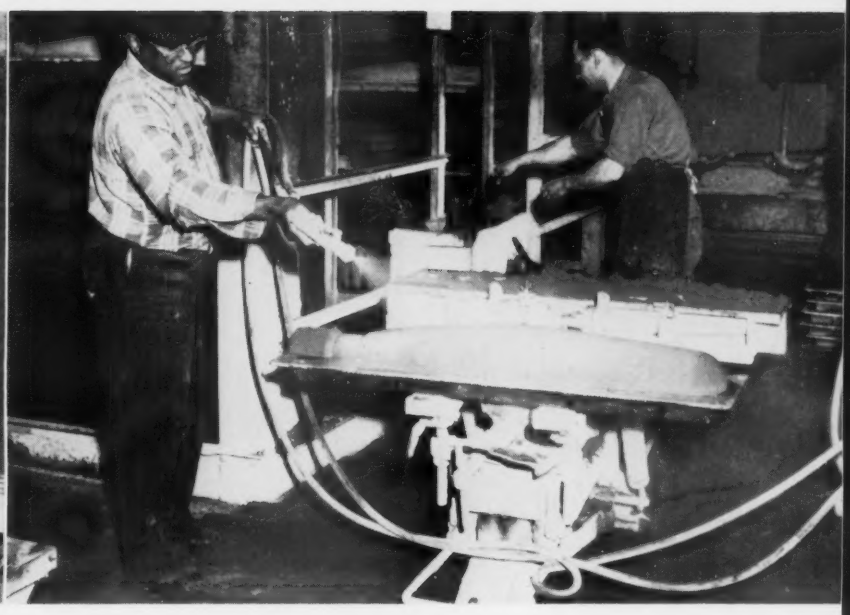
DECISION of the United States Government to release information on the 280-mm shell makes available an interesting story on the production of this precision alloy steel casting. The Riverside Crankshaft Division of Auto Specialties Mfg. Co., St. Joseph, Mich., is turning out this shell at the rate of 1500 per month.

Dimensional accuracy and proper balance of the finished shell are extremely important if it is to be fired with reasonable assurance that it will hit the target. During firing tests at Aberdeen Proving Grounds in Maryland, all five of the rounds first tested were grouped neatly in a 29-yd square target at a 23,000-yd range. Shells of conventional manufacture were not nearly as accurate.

Length of the shell casting is 49.375 in. with 11.012-in. outside diameter at the back half of the shell, tapering in the front half to 2.38 in. at the nose. Nearly 1500 lb of metal is poured into each mold to obtain a sound, finished casting weighing 600 lb. Early development work on the casting design called for making the front and back halves separately and assembling them by a threaded joint. Although the shell had good flight characteristics, slight movement of the two halves at the moment of impact with the target led to development of the single unit design, with attendant dif-



Following hand-coating, the cores pass under a ventilated hood with water curtain for spraying



Green barrel core halves are sprayed with silica wash no the rockover machines before baking

By ROBERT H. HERRMANN
Associate Editor

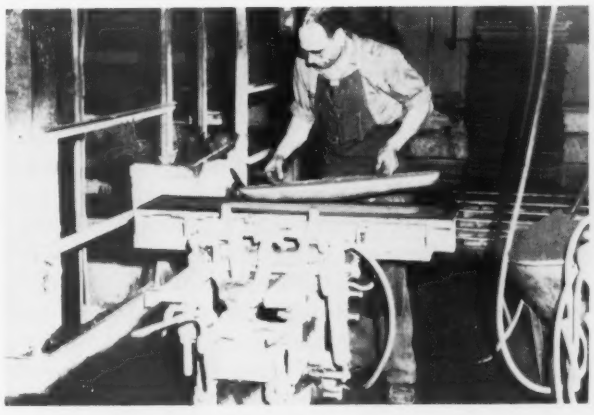
mm Artillery Shell

ficulties in the casting procedures employed.

Shells are poured in stack molds comprised of baked core sections. Silica and lake sands are delivered into the foundry by truck and dumped onto a floor grid, the sand falling through a chute to a rubber belt conveyor. A bucket elevator picks up the sand from the conveyor and raises it to a chute which discharges into a rotary, oil-fired drier. Lake sand is dried at approximately 400° F, depending upon the amount of moisture in the delivered sand. Moisture tests are made on each batch delivered to the foundry. Since silica sand is purchased dry, it is run through the drier with no heat, merely as a convenient way to get it into the sand handling system for cleaning and storage.

Sand discharged from the drier falls through a hooded and ventilated chute to a vibrating screen to remove sticks, stones and other refuse, which is shaken off into a container and periodically is picked up by lift truck and carted away to the dump. Sand passing through the screen travels down a chute to a bucket elevator and is deposited on a 20-in. rubber belt to be plowed off into storage hoppers.

The first hopper, of 100 tons capacity, receives silica sand. Lake sand is plowed off at five points into the larger bin which has a 500-ton capacity.

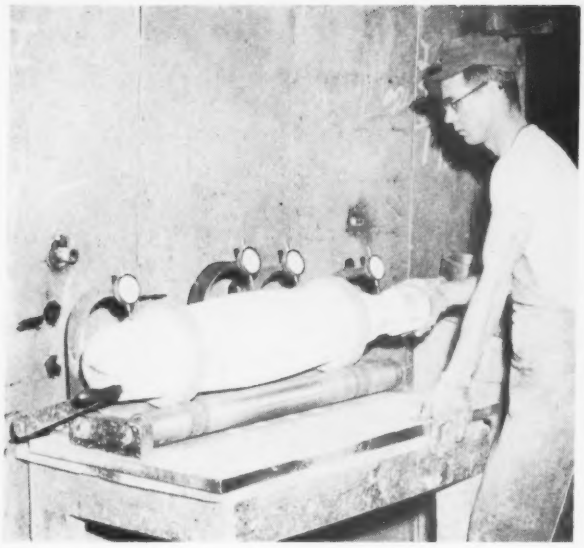


Barrel core halves are hand-rammed in aluminum boxes, a loose piece forming the center cavity

TABLE I—Sand Formulations

Ingredients	Barrel Core	Body Core	Gating Core
Cereal binder	22 lb	22 lb	25 lb
Silica flour	225 lb	150 lb	275 lb
Iron oxide	40 lb	20 lb	.....
Silica sand	1000 lb	.....	1000 lb
Lake sand	.....	1000 lb	.....
Core oil	12 qt	12 qt	12 qt
Kerosene	.....	2 qt	.....
Water	9 gal	6½ gal	9½ gal

Ingredients are mixed dry for 1 minute, 3 minutes after the water addition and 3 minutes after the oil additions.



Assembled barrel cores are rotated on a testing machine with gages showing concentric variations

After five body cores are assembled, the barrel cores are set in place and locked by steel rods

Because the molds are over 6 ft high, a catwalk must be erected for workmen who do the pouring

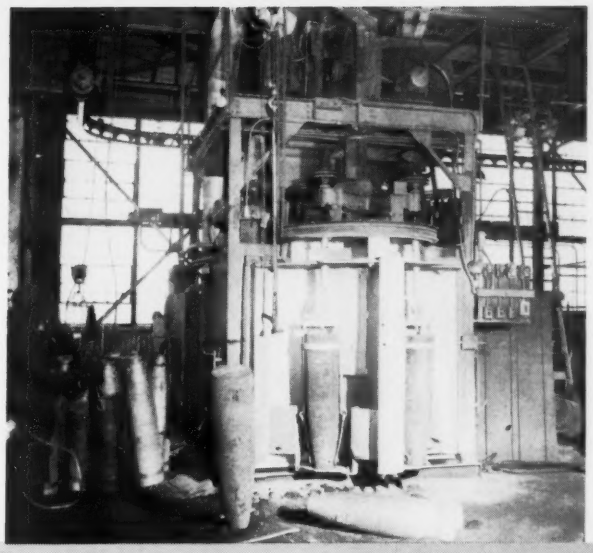
Sand is removed from the bins by five manually operated gates at the bottom of the larger bin and one gate on the smaller one. It is caught by a 20-in. rubber conveyor belt, moved to a bucket elevator and discharged to another 20-in. belt over the 5000-lb capacity hoppers above the mullers. Air-cylinder-operated gates, pushbutton-controlled through solenoid switches and timers, open and close these gates, feeding sand to the mullers. On the basis of precalculated flow-weight relationship, the timers hold the gates open a certain length of time, allowing the desired weight of sand to fall into the mullers. Other dry ingredients are weighed and dumped into the mullers by skip hoist charger. The sand preparation area is equipped with three mullers to produce sand mixtures for the shell work. Every batch is tested for dry tensile strength.

Since the mullers are located on the second floor, discharge of prepared sand is by gravity to rubber belt which conveys sand to hoppers located above coremaking machines on the first floor. Hand plows which feed the hoppers are operated by a woman from a catwalk beside the distributing belt. Through pushbutton controls which actuate station numbers on a panel at the sand preparation center, she notifies muller operators of the type of sand needed at coremaking stations. The various formulations are shown in Table I.

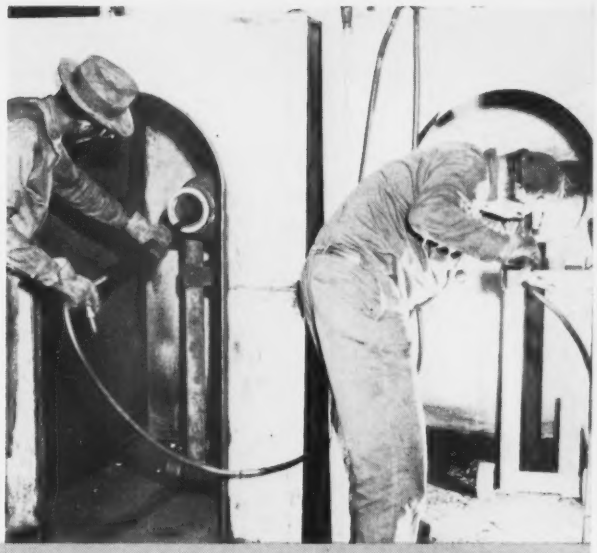
Body cores forming the outside of the mold cavity for the shell are made on jolt rollover machines. They are approximately 20-in. square and 4 in. thick. Each body core section is reinforced with two U-shaped, $\frac{3}{8}$-in.-diam rods inserted in each side. After each core has been rammed, a 24 x 27-in. aluminum drier is taken off a hook suspended from an overhead monorail delivery conveyor and placed on the corebox. It is held in place by air clamps as the assembly is rolled over. Plate and core are lowered from the box by an air-cylinder-operated table and are rolled out on a short length of roller conveyor from which they are lifted by two men and loaded into an oil-fired tower oven. Each of three ovens handles body core production from three rollover machines grouped in front of each oven.

Body cores are baked at 490° F for 3 hr, 40 minutes. Upon completion of the bake, two men remove the cores from the oven, place the core plates on the monorail hooks for conveyance back to the coremaking stations and set the cores on special, swiveling holders on a car-type conveyor, which travels at the rate of 1000 cores per hour. Cores are hand-painted with a silica wash consisting of silica flour, bentonite, rosin and a wetting agent. As the conveyor moves on, it passes under a ventilated hood where the cores are sprayed with the same type wash thinned down.

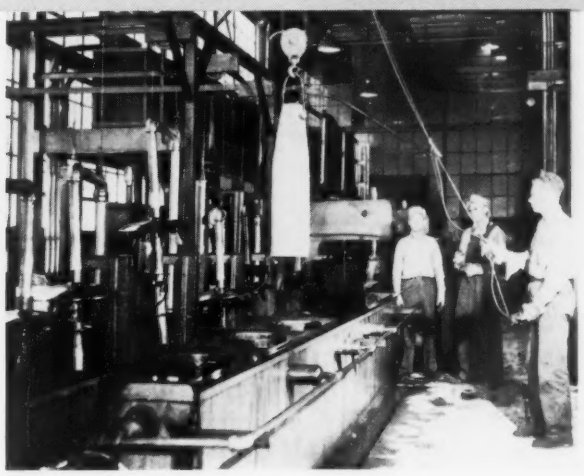
The conveyor then passes through an oil-fired horizontal oven at floor level where cores are dried



Revolving hangers hold shells in blast cabinet for simultaneous interior and exterior cleaning



Following blasting, the shells are wheeled into hooded enclosures for grinding the cavity bottom



Shells are oil quenched in a five-compartmented tank. A shell is shown being lowered into tank

Gate stubs and lifting lugs are removed with a swing grinder following the final blast cleaning

at 500° F for 18 minutes. As they emerge from the oven they are inspected visually by three women. Two men unload finished cores to racks of 2 x 4-ft shelves suspended from an overhead monorail for transportation into the foundry.

Most critical core in the mold assembly is the barrel core, which forms the shell cavity into which the explosive is loaded. It must possess a high degree of accuracy and concentricity so that the finished shell will have proper flight characteristics. It is a hollow, cigar-shaped core which forms a cavity in the shell approximately 8¾-in. in diam at the widest point by 41 in. long. Opening in the head end of the shell is about 4¼-in. in diam.

The core is hollow to permit easy collapsibility during contraction of the casting when it cools, thus avoiding distortion. The core is composed of two 48-lb longitudinal halves pasted together. Wall thickness varies from 1¼ to 1½-in.

Core halves are made on four rockover machines in aluminum boxes with a loose piece to form the cavity. The loose piece is held in place by four toggle clamps during the hand ramming operation. Four 3/16-in. wires laid lengthwise plus a piece of expanded metal mesh at the head end are used in each core half for reinforcement.

After the core is rammed, the loose piece is removed and an aluminum drier placed in the cavity. An aluminum bottom board is placed on top and clamped in place with the four previously mentioned clamps. The assembly is rolled over to the other side of the machine and the box vibrated and lifted off the core. The core is sprayed with a silica wash and then loaded into an oil-fired tower oven by two men.

After baking at 490° F for 2 hr the cores are unloaded to a stand and given another wash spray while hot. Then they are placed, bottom board and all, on a flat-topped car and hand wheeled to the cooling area where they (*Please turn to page* 234)

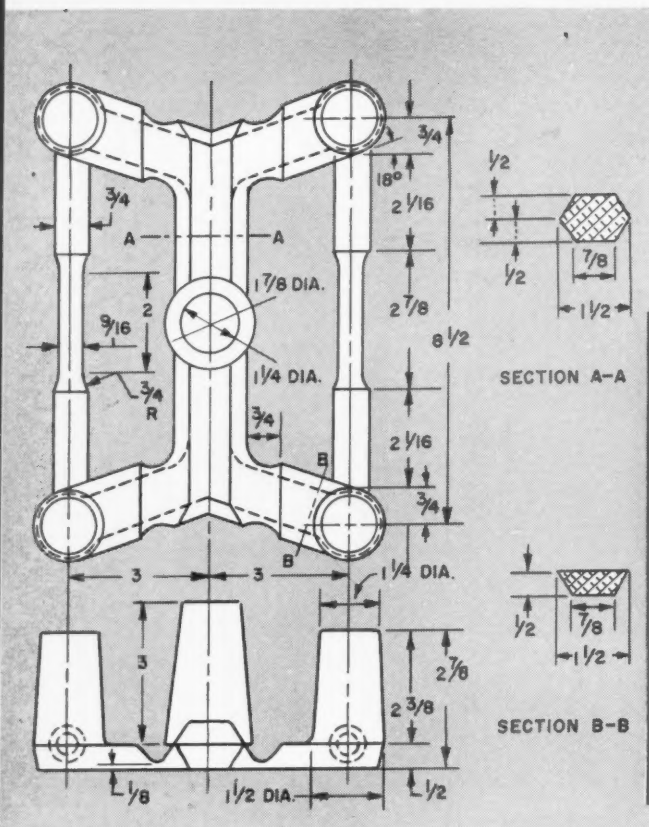
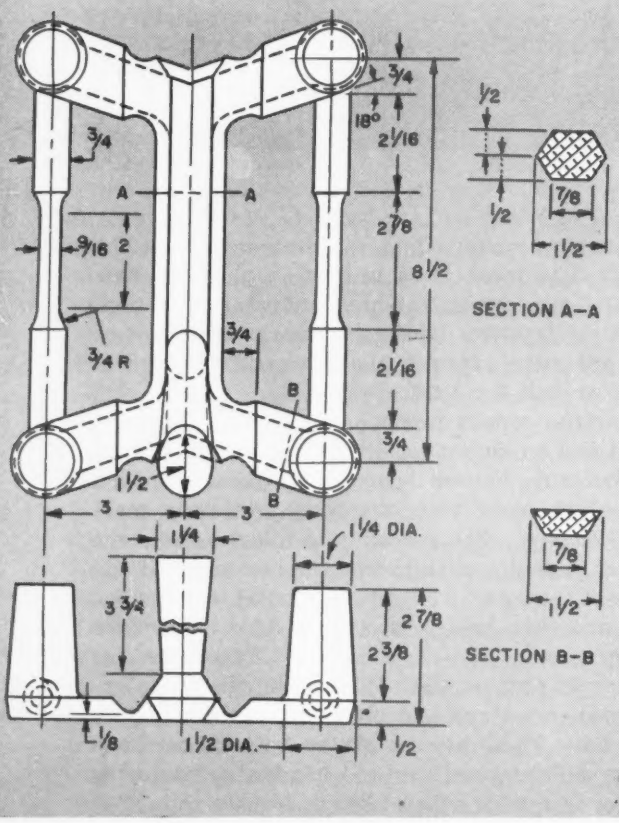


Fig. 11—Illustration from Navy Specifications shows two familiar and recommended patterns which are very similar, with the exception of the sprue design



TEST BARS for Copper

Concluding their two-part article, begun last month, the authors move their attention from copper-base alloy to aluminum-base alloy test bars

IN ADDITION to indicating the quality of the metal in the melt from which the castings they represent were poured, aluminum alloy test bars also play an important part in the inspection of castings by checking on the correctness of the heat treatment to which the castings were subjected. This is one instance where aluminum test bars differ from copper-base alloy test bars, since the large majority of aluminum castings purchased to specifications requiring test bars are also heat treated.

Aluminum test bars cast with good foundry practice from metal of good quality are capable of indicating whether the heat treatment was within the specified limits and produced the required mechanical properties. Occasionally, correctness of

By ROBERT A. COLTON
Federated Metals Division
American Smelting & Refining Co.
Barber, N. J.

and DONALD L. LAVELLE
Central Research Laboratories
American Smelting & Refining Co.
South Plainfield, N. J.

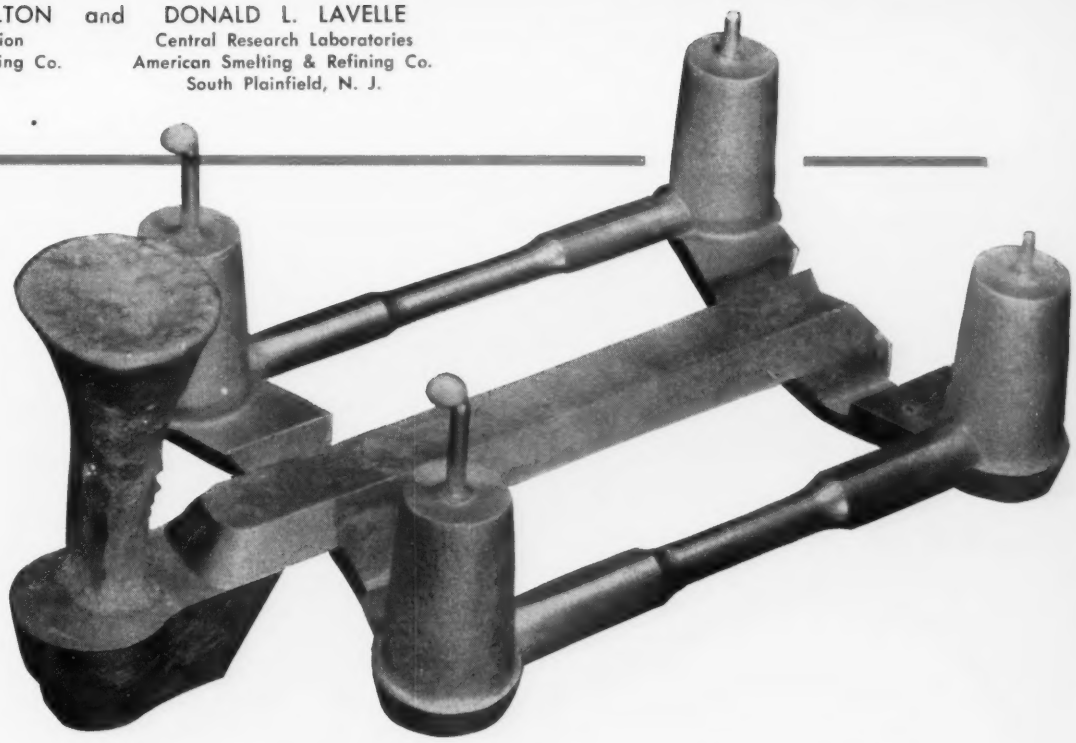


Fig. 12 — In modification of type of design shown in Fig. 11, center runner is extended at one end, a basin placed beneath it, and sprue placed on this basin at mold edge

and Aluminum Base Alloy Castings

the heat treatment is checked by testing the hardness of the castings, but this method is only approximate, and the use of test bars gives a much better indication.

There probably are more data available concerning the comparative mechanical properties of separately cast test bars and test bars cut from aluminum castings than for copper-base alloy castings. This may have resulted from the extensive use of light alloy castings in the aircraft industry during World War II and from the necessity of obtaining a great deal of information in a short time. However, the availability of these data has not served to establish a clear-cut relationship between the two types of test bars.

Actually, existing government and engineering society specifications tend to confuse the issue rather than to clarify it. For instance, the Navy, in the 46Alf Specification, or the newer Military Specification MIL-A-17129, states that test bars cut from castings shall give the same properties as separately cast test bars. These two specifications also say that a minimum of three test bars shall be cut from the casting, from the thickest, an intermediate and the thinnest sections, but it is not stated what shall be done with the results. Presumably they would be averaged.

Federal Specification QQ-A-601a for sand-cast aluminum base alloys states that test bars cut from castings shall meet 75 per cent of the tensile strength and 25 per cent of the elongation requirements of separately cast test bars. This is a reasonable specification that has been found to be quite workable. In some respects, however, even these figures are not practical. The requirement of 25 per cent of the elongation, for instance, is difficult to meet in cases where the specified minimum elongation is 3 per cent. Twenty-five per cent of 3 per cent is 0.8 per cent elongation, which is not accurately measurable.

A more realistic figure would be one-third of the separately cast elongation requirement of 3 per cent, which would give a requirement of 1 per cent for test bars cut from castings. The AMS (Aeronautical Material Specifications) which are issued by the Society of Automotive Engineers and used by the majority of aircraft engine manufacturers state that test bars cut from castings shall meet 75 per cent of the tensile strength requirements and shall have an elongation equivalent to that of separately cast test bars.

The specifications discussed show three different

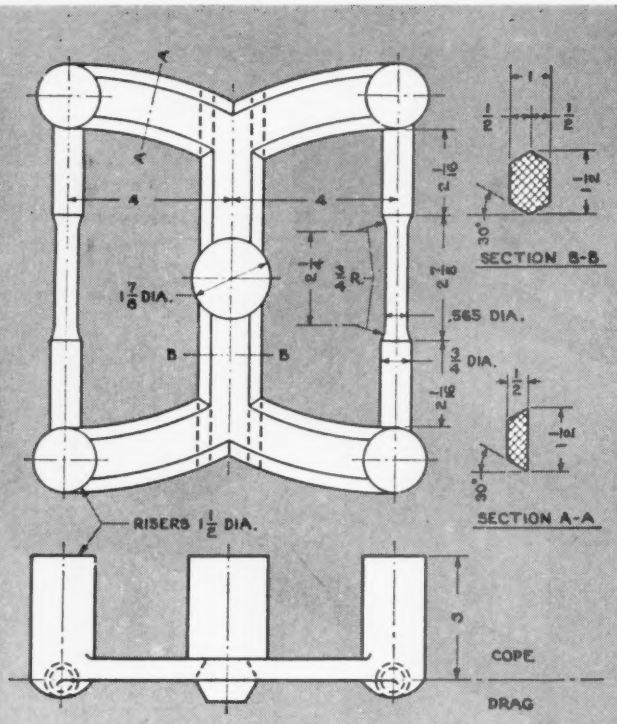
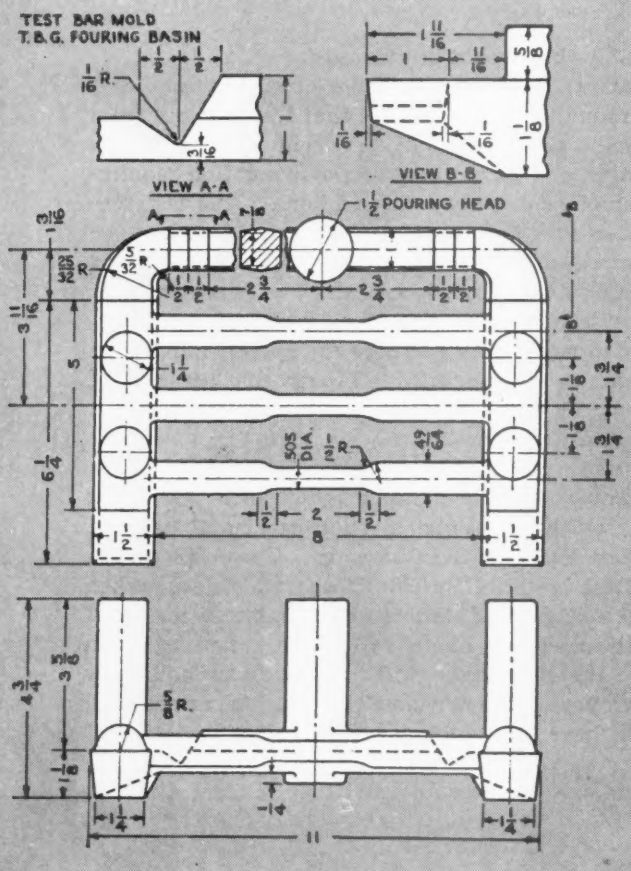


Fig. 13—Illustration from the Federal Standard Stock Catalog shows the test bars specified by Federal Specification QQ-A-601a. Rarely used top pattern is poorly designed. The lower one is good



opinions of the relationship between separately cast test bars and test bars cut from castings. It is possible that as more data are accumulated and previously accumulated data are published, a more uniform and realistic relationship can be established between the properties of separately cast test bars and those cut from castings. This type of information would be of great benefit to persons concerned with the design of castings and the specifications for their material. However, as has been pointed out in the first part of this paper (June issue), separately cast test bars do not test castings and should not be considered a measure of casting strength or quality.

The shape and dimensions of the test bar used for aluminum alloy testing are similar to those of copper-base alloys—that is, the tensile section of the test bar usually is 2¼-in. long, with a 2-in. section for the gage length, and usually is 0.505 in. in diam at the center with a ½-in. minimum radius from the tensile section to the shoulder section, which is at least ¾ in. in diameter and occasionally as large as 1 in.

There is one important distinction between practice for copper base alloys and for aluminum alloys. In aluminum alloys, almost without exception the test bars are tested in the as-cast condition with no machining whatsoever. The shoulders of the test bars usually are gripped in friction grips in the tensile testing machine so that all that is necessary is to saw the test bars from the gate to make them ready for testing. Occasionally it may be necessary to machine the shoulders of the test bar in order to adapt them to certain types of grips on the tensile machine. The practice of machining aluminum test bars to this standard shape from a larger size almost has disappeared.

Design of Test Bar Patterns — The gating and risering of aluminum test bars vary considerably from specification to specification and from foundry to foundry. Some time ago, the Test Bar Committee of the Light Metals Division of the American Foundrymen's Society circulated a questionnaire to leading members of the aluminum casting industry and received a surprising variety of test bar designs, some of them good, many acceptable, and many quite unsuited to the purpose for which they were being used. Since aluminum test bars are not machined, it is not possible to place gates or feeders on the tensile section of the test bar as is done in some copper base test bar designs. All of the gating systems and risering systems therefore must be attached to the ends or shoulders of the test bar.

Generally speaking, a test bar design should not necessarily produce the best possible properties. Rather, what is wanted is a test casting that will give the most reproducible and consistent data, so that a foundry could obtain these properties with a

Fig. 14 — Test bar casting made from the design at the bottom of Fig. 13 has risers which have been enlarged somewhat, but still appear to be inadequate to feed the test bar properly

minimum amount of rejects, experimentation and experience. Some of the test bar designs available today are capable of doing this, but there is much room for improvement. The Test Bar Committee referred to above presently is studying available designs and endeavoring to develop a test bar gating and risering design that more nearly will meet all requirements.

The government specifications show the type of test bar gating system which may be used. However, if a foundry has a different design of its own which will give acceptable properties, there usually is no difficulty in getting the government agency to accept this pattern.

Fig. 11 shows two designs which probably are familiar to everyone who has made aluminum test bars. This illustration is from Navy Specification 46Alf or MIL-A-17129 (Ships) and shows two recommended patterns, which are quite similar except for the design of the sprue. As can be seen in the drawing at the top, the sprue is in the center of the mold. In the other drawing the design shows a slanting sprue, which brings the opening in the mold toward the edge of the mold so that less turbulent pouring can be accomplished.

The difficulty with the sprue in the center of the pattern is that the ladle must be held over the center of the mold to pour, resulting in a probable fall of at least 8 in. before the metal hits the mold; this fall creates agitation which results in entrapment of air and dross in the metal stream. Also, the shape of this sprue is poorly designed and as a result creates turbulence in the metal stream. In the design at the bottom, showing the slanting sprue, there is some improvement since the ladle may be held much closer to the edge of the mold, but there still is much to be desired.

A modification of this type of test bar design, which has worked out quite well in practice, is shown in Fig. 12. The center runner has been extended at one end, a basin placed beneath it, and the sprue placed on this basin at the edge of the mold. This design enables the ladle to be brought down to the mold, and pouring then can be accomplished with a minimum of turbulence. Note also that a rectangular cross-sectional sprue has been used which tends to reduce turbulence and mixing of air in this section of the gating system.

As can be seen in Fig. 12, the severe chokes in the gates are about $\frac{1}{8}$-in. or less in thickness. The effect of this gating is to cause the center runner to fill rapidly, so that both ends of the test bar feed equally. It has been found that when this mold is poured at too low a metal temperature, misruns are experienced at the center of the tensile section of the test bars, indicating that the molten

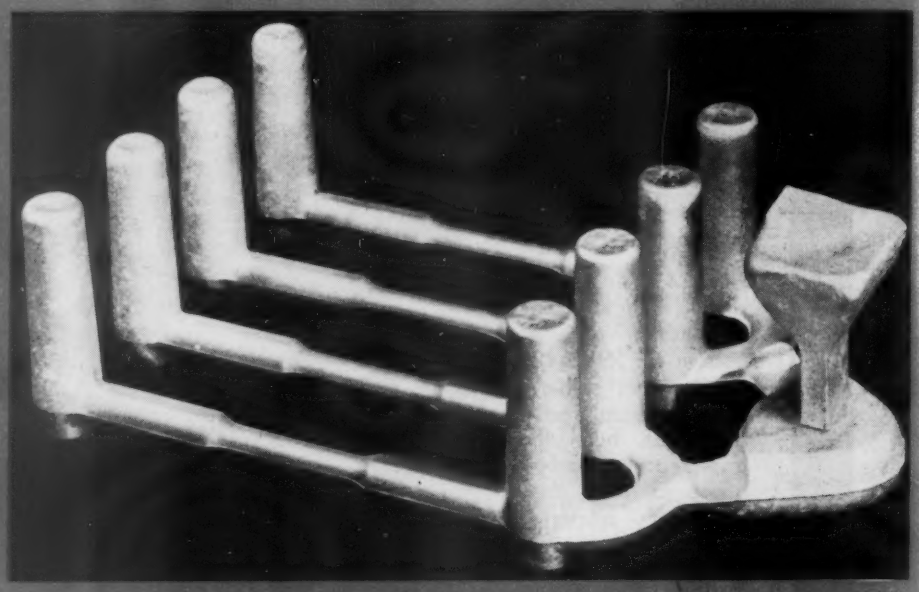


Fig. 15 — This view shows a basic type of test bar, one in which all the metal flows into one end of the bar, passes through the tensile section, then fills riser at other end

metal tends to meet at this point. The meeting of the metal in the center of the test bar results in desirable solidification gradients since the metal freezes first in this area and solidification then progresses outward toward the end of the test bar and finally to the risers.

Fig. 13 is an illustration from the Federal Standard Stock Catalog showing the test bars specified by Federal Specification QQ-A-601a. The pattern at the top rarely has been seen in use, something which probably is a good thing for foundrymen because this design is poor and would make it difficult to produce clean, sound test bars.

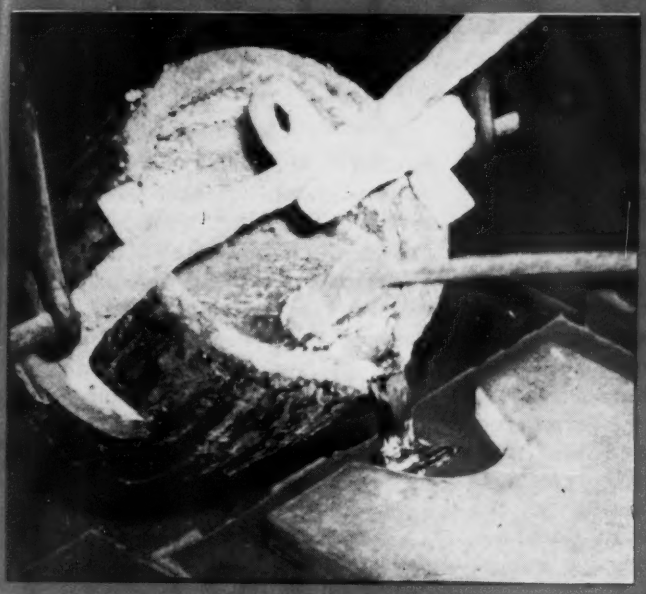
At the bottom in this illustration is shown a good test bar design. This is a desirable design because the sprue is at the side of the mold, chokes in the runner cause the sprue to fill rapidly, the metal flows from the chokes into the drag runners and then into the tensile section of the test bars, and the risers are the last to fill. The principal objection to this pattern lies in the rather inadequate risers, which are not believed to be sufficient to feed the large runner sections and shoulders of the test bars. Fig. 14 is a photograph of this test bar casting. It can be seen how this foundry enlarged the risers somewhat, but they still appear to be inadequate.

In the AFS survey on test bars, it was found that all types of test bars examined fell into two classes. The first class is illustrated by the type discussed, wherein the metal flows into both ends of the test bar simultaneously and tends to meet in the middle of the tensile section. In the second basic type, all the metal flows into one end of the bar, passes through the tensile section of the bar and then fills a riser at the other end. Every test bar pattern examined fell into one of these two basic classifications.

Fig. 15 is an illustration of the second type of test bar. This pattern originally was designed with a horn sprue and no chokes. In this modification the horn sprue has been removed, the chokes inserted and the sprue located as shown. This type of test bar has the advantage of producing twice as many bars for the same amount of metal as the type illustrated under the Navy specification, which only produces two test bars per cast of 5 lb of aluminum. However, this second type does not give as good feeding as the so-called "two-bar" design. It has been found with alloys of the 95.5 Al—4.5 Cu type, which are difficult to feed, that this design gives distinctly lower properties than the "two-bar" type, in which the feeding is much better.

One reason for this difference is that as the metal flows through the tensile section, sand temperature is raised. Relatively colder metal is the result in the far riser and hot metal in the sprue, causing undesirable solidification conditions. The risers also are quite small, a factor which contributes to decreased soundness in this type of test bar. For alloys which are easily fed, however, such as the 95 Al—5 Si type, test bar designs of the second type are quite satisfactory.

There is a large number of modifications of these two basic types. For the most part, the "two-bar" types follow the Navy design, and a wider variety of patterns is found for the second type where more or fewer test bars are included and many different types of risers and gates are used. As pointed out before, however, all test bar designs for



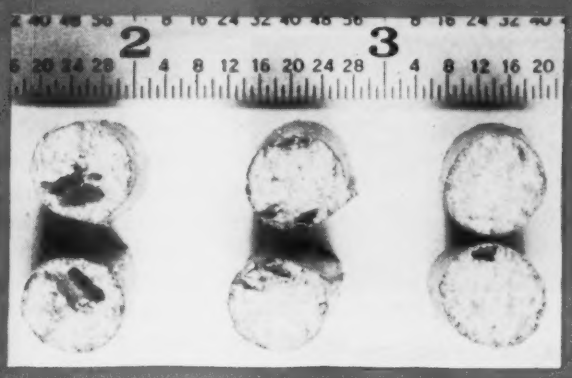


Fig. 16 (left)—Skimming melt surface would improve this already good pouring practice

Fig. 17 (above)—Oxide inclusions caused low elongation which made these bars fail

aluminum alloys fall into these two basic classifications.

Producing Test Bars—The problem of the production of good aluminum test bars would appear to be a relatively simple process since all that is necessary is to make a clean melt of aluminum at the proper temperature and do a good job of pouring it into a test bar mold. But many small details contribute to the success of a test bar. If too many of these details are overlooked, the probability of rejected bars becomes quite large.

The test bar pattern should be accurate. The tensile section of the test bar should be round. This may seem to be an obvious statement, but it is surprising how many test bars have been examined which were not round. A test bar should be round because the diameter is measured at right angles to the parting line, and the area of the bar is calculated from that measurement. If the bar is shaped like an oval, for instance, and the long dimension is measured, then the calculated strength of the test bar will be too low. If a foundry uses a loose, split pattern, it is almost impossible for the molder to produce a test bar casting that does not have fins or a shift at the parting line.

These defects do not affect the cross-sectional area of the test bar, but are detrimental because they give areas on the surface of the test bar which may give rise to premature failure. If a foundry finds that it must make test bars, it is recommended strongly that the best possible pattern or matchplate be obtained that can be afforded. It is not economical in the long run to try to economize on a test bar pattern. Actually, the cost of a test bar is relatively unimportant compared with the value of the castings it represents. Castings worth many thousands of dollars may be rejected because of several bad test bars. Therefore, the importance of the test bar should not be minimized.

In making the test bar mold, a foundry should use normal care and good practice. It is necessary to have a clean, accurate, sand mold, and there are several small details to watch for. When a slip flask is being used with a jacket on the mold, for instance, a shift very easily can be caused when the jacket is placed around the mold. Often the outside test bar on one side of the casting is shifted while bars on the other side are satisfactory, because the jacket was placed with unequal pressure at the sides of the mold.

Volumes have been written on the proper way to melt aluminum. Simply stated, good practice for fuel-fired furnace melting is to use clean crucibles and clean metal, to melt fast in a slightly oxidizing atmosphere, not to raise the temperature much over the desired pouring temperature, and to permit no more than an absolute minimum of stirring or agitation of the melt.

In electric melting there are no products of combustion with which to be concerned. In fuel-fired crucible melting, the melting cycle can be conducted in two ways. If, for instance, the pouring temperature for certain test bars is to be 1250° F, in one system the metal is heated to somewhat over 1250° F, the crucible removed from the furnace, the metal allowed to cool to 1250° F and then poured. In the other method, as soon as the last metal has melted in the crucible, the fuel is turned off, and the metal is allowed to come up to temperature by the retained heat from the furnace (*Please turn to page 246*)

QUESTIONS

Designing a Permanent Mold

QUESTION We would like to have complete information on making a permanent mold for producing the circular aluminum plate shown in the accompanying blueprint. Plate is 26 13/16 in. in diam, and has a height of 2 in. Metal thickness is about ½-in. except near the center where it is 1 9/16 in. thick. We make a dense grade of cast iron that would be suitable for the mold, and would like data on design, draft angles, whether to use metal or sand cores, operating mold temperature, mold coating, etc.

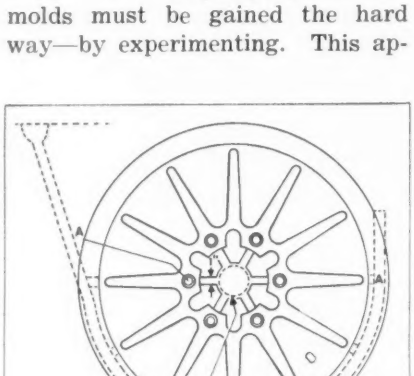
ANSWER Designing a permanent mold which will produce satisfactory castings after a few minor adjustments requires considerable skill and experience, and should be done by those who engage commercially in the field. However, if you would like to experiment—a practice involving time, effort and expense — we suggest the design shown on the accompanying sketch. As indicated, the casting is poured in the horizontal position using a ¾-in. sprue which drops directly into an enlargement or reservoir at the base.

The latter feeds into six 1 x ¼-in. runners equidistantly spaced which lead into the casting. Interposed between reservoir and runners is a perforated screen which, in addition to acting as a choke, will prevent entrance of dirt or dross and reduce turbulence.

You may be able to pour the casting successfully without use of the screen; the only way to determine this is to try making the casting with and without the screen. It might be pointed out that the position of the screen in relation to the runners will have a bearing on its functioning. Placing the screen tightly against the runner openings permits only the area of the screen immediately in contact to function, and thus by reducing the effective area acts as a choke as well as a filter and cleaner. When the screen is located a little distance, say ¼-in., from the runners the whole screen area will be available, and the screen, while filtering effectively, will have little choking action.

Skill in designing permanent molds must be gained the hard way—by experimenting. This applies particularly to determination of how and where the contraction of the casting will occur and the allowance necessary in the casting cavity. It is evident that the inner rim cannot pull in, so the shrinkage allowance must be placed on the outside of the rim. Likewise, the metal cores forming the holes in the central area will tend to restrain contraction away from the center. To be on the safe side it might be assumed that contraction will occur and provide shrink allowance—that is, make the central opening smaller than it should be. However, before making any allowances, we suggest that you make the cavity with the dimensions of the desired casting. Pour a casting and measure it carefully to see if it meets requirements. Then the mold can be machined for any allowances.

Permanent molds usually operate at around 600 to 700° F. A number of proprietary mold washes on the market are composed of a refractory suspended in water, with or without addition of sodium silicate as well as such materials as graphite, rouge, etc. Coating is applied to the molds while hot, and experience is required in the operation. Spraying is preferable to brushing on since the coats should be thin. If they are thick either through original application or by building up, the coating tends to spall off. Pouring temperature of the aluminum alloy will have to be determined by experiment. It should not be poured at a temperature any higher than necessary to fill the cavity satisfactorily.



Casting is poured in horizontal position, with ¾-in. sprue

Since the proposed mold is somewhat large in diameter, we strongly recommend the use of a pouring basin so that the lip of the pouring ladle will not be too high above the sprue opening. Pouring basin could extend almost to the edge of the mold, and by use of a ladle holding just enough metal to fill mold and sprue, there would be no waste.

While we have suggested one mold design, it should be pointed out that another is obvious, and that is to design for vertical pouring. In this the runner would follow the contour of the casting and about ½-in. away, as indicated by the dotted lines in the accompanying sketch. A series of 1 x ¼-in. finger gates lead from the runner to the cavity.

We believe that the runner should extend up on the opposite side from the metal entrance for a few inches to absorb some of the energy developed in changing the direction of flow from vertical to horizontal at some other point than at the gate. Also, the sprue from the top of the mold should be offset from the vertical as indicated, to provide a smoother flow instead of an abrupt drop. The runner and sprue may be 1 in. square, and the gates 1 in. wide and ¼-in. deep located in the mold half containing the casting so that they can be cut easily

with a band saw. Again, as mentioned earlier, it may be wiser to make the gates smaller than indicated; pour an experimental casting, and then enlarge the gates if necessary.

Obtaining a Smooth Surface

QUESTION We are interested in learning to make precision bronze castings in plaster molds. At present we have tried a proprietary material which is highly permeable, using the 85-5-5-5 alloy. Our problem is—what noncorrosive alloy could we use that would cast smoothly in plaster molds.

ANSWER Your reference to a noncorrosive alloy used in connection with the 85-5-5-5 alloy, plaster molding, and smooth castings evidently means that you are having trouble in producing satisfactory finish. That is not unexpected because difficulty is encountered in copper-base alloys containing over 1.5 per cent lead.

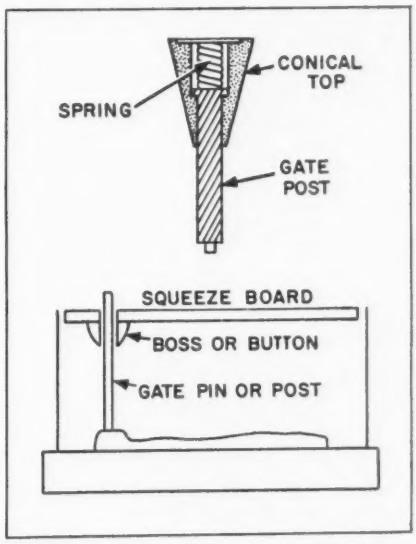
Possibly some improvement might be obtained with the 85-5-5-5 alloy by calcining the mold, but it is advisable to turn to yellow brass low in lead. However, manganese bronze, aluminum bronze, silicon bronze and beryllium copper castings are produced successfully by the plaster process, as well as aluminum alloy castings.

A yellow brass used to a considerable extent in plaster molding contains 57 to 62 per cent Cu, 1 to 2 per cent Sn, 0 to 1.5 per cent Pb, and remainder Zn. It may contain up to 0.5 per cent each of Al, Mn, Fe and Ni. It also might be pointed out in connection with plaster molding that pouring temperature of heavy section castings should not be over 2000° F and may run up to 2300° F in small thin-section castings.

Compacting Sand at Sprue Top

QUESTION Will you let us know the quickest way by mass production on molding machines to mold the runners without afterward giving the hole an extra squeeze by hand?

ANSWER We presume you are referring to the opening of the sprue or downgate at the top of the cope. On squeezer machines the hand operation can be eliminated by several methods. One, where the sprue pin is firmly attached to the pattern plate, is to provide a boss with a hole through it on the underside of the squeeze board or platen. Boss may be hemispherical or conical in shape



Provide boss with hole through it on bottom of squeeze board

and located so that the hole in the center is directly over the sprue pin. Hole in the center of the boss is a loose fit for the sprue pin.

Another method is to use a collapsible sprue former or maker comprised of a cylindrical sprue pin or post over which a cone-shaped section slides. The post forms the lower part and the cone the upper, and the latter is maintained in position by a spring. Pin on bottom of the sprue post fits into a drilled hole at the proper place in the runner system on the pattern. Pressure of the squeeze board on the top of the mold forces the conical part of the sprue former down on the post and compacts the sand around it. When the squeeze board is released the conical part springs up to its original position, permitting the former to be withdrawn easily from the mold. A third possibility is use of solid rubber sprue pins or posts.

Has Trouble with Some Brass

QUESTION We make small ornate yellow brass castings for use as furniture hardware containing 66 per cent Cu, 1 per cent Sn, 2 per cent Pb, 0.35 per cent Fe, 0.5 per cent Ni and 30 per cent Zn. Normally our castings are of excellent quality but some shipments of ingot cause trouble. Although the analysis is similar with the exception of higher Pb content, the metal has a tendency to be drossy, brittle and has a drab grayish color. Shrinkage is greater and the castings do not respond to barrel finishing operations. The troublesome metal also has a tendency to produce misruns. We deoxidize the metal with 0.2 per cent Al, and unless we use additional Al the metal seems sluggish and the castings have a reddish tint.

ANSWER The question raised here is not entirely clear. Apparently the general run of castings are satisfactory, but occasional lots of ingot metal will give foundry difficulty. Trouble may lie in the fact that the yellow brass ingot is made in two different forms by various smelters. It can be purchased guaranteed aluminum free which offers the possibility of greater control of the aluminum content in the finished casting—it also can be purchased with aluminum in it although this certainly is not recommended.

Problem seems to resolve down to occasional lots of yellow brass that are unusually drossy either from residual aluminum content or from careless manufacturing technique. This could cause yellow brass to be brittle and have a drab gray color or include oxides. Most likely oxide is aluminum, although carelessness may introduce excessive quantities of zinc oxide.

One revealing statement is that troublesome metal has a tendency to promote more misruns. This is a fairly certain sign that excessive oxide content has something to do with the problem since it can be

well established that presence of oxides reduces castability or fluidity of brasses and bronzes more than any other influence, excluding temperature. It is for this reason that such alloys as silicon bronzes have high castability and tin bronzes not deoxidized pour sluggishly. Should a yellow brass have an excessive dissolved oxide content it certainly will affect its mold filling qualities. In addition, this can lead to shrinkage in castings because the metal does not feed properly.

Perhaps the best approach is to make certain that the incoming material is aluminum-free and manufactured to a quality specification. There should be no included dross on the top surface of the ingot and melt-down dross should be normal. Careful attention to the type of metal that is put into the furnace for melting should give more consistent results. Just as no casting is any better than the pattern from which it is made, it is also true that the quality of the metal in the casting can be no better than the quality of the ingot from which it is made.

Is Troubled with Tin Sweat

QUESTION We have been having trouble lately with our large bronze castings made from the 88 per cent Cu, 8 per cent Sn, and 4 per cent Zn alloy using 50 per cent scrap gates and risers. A white metal seems to come from the alloy and form an irregular skin 1/32 to 1/8-in. thick which is hard and brittle. Molds are left to cool overnight. When this condition does not arise the castings are quite sound, and we do not have much trouble with smaller castings. A small piece of the white metal is enclosed for your inspection.

ANSWER Difficulty experienced in your case is an excellent example of the laws governing gases in bronze. As suspected, the white material is principally a copper-tin eutectic containing a large amount of tin. This commonly is called "tin sweat" and is found usually in circumstances similar to those described.

To understand what has occurred it must be remembered that the copper-tin eutectic involved is the lowest melting point material found in this type of alloy. In other words, this represents the last material to freeze. When gases are dissolved by the molten bronze they follow the law that the higher the temperature of the bronze, the greater the quantity of gas dissolved. When the temperature falls the metal tends to give up its gas to attain equilibrium. At the time of solidification the bronze gives up substantially all of the gas that has been dissolved since the solid metal has relatively small tolerance for gases.

Consider then, that during melting this bronze has dissolved a considerable quantity of gas. When it is poured into the mold and solidification starts, gas is rejected from the freezing metal into the remaining liquid. As a result the remaining liquid builds up a concentration of gas so that at some time, as freezing progresses, the pressure of the contained gas reaches the pressure of the atmosphere plus the weight of metal above it so that it can escape to an area of lower pressure. In this particular case the gas pushes up through the casting, driving ahead of it any remaining liquid which then oozes out on the top of the casting or riser—liquid which usually is found high in tin.

An interesting aspect of this phenomenon is that the smaller castings made with the same metal frequently do not exhibit this effect. The reason is that time is essential for the gas concentration to build up, and if solidification occurs too rapidly, that cannot occur. In order to eliminate the problem it is necessary to minimize the amount of gas dissolved during melting. There are a number of melting techniques used for this, but the one generally recognized as being the most suitable for the average foundry is the so-called "oxidizing" method.

In this the metal is melted without any flux or cover with a highly oxidizing flame. This means that the products of combustion in the furnace have an excess of oxygen in them. The metal is not superheated unnecessarily or allowed to remain in the furnace and "stew." The metal is removed from the furnace with only enough superheat to handle to the mold side. It is skimmed clean and, just prior to pouring into the mold, about 2 to 3 oz of 15 per cent phosphor-copper per 100 lb is added. This should be stirred in lightly or not at all, and the casting poured.

In case a tilting furnace is used as high as 4 oz of phosphor-copper may be added; half is placed in the bottom of the pouring ladle and the other half is added as described. The fact that castings are sound when tin sweat does not occur indicates that there is a variation in melting practice which may be controlled, and attention should be given to that. Other methods of controlling gas such as bubbling nitrogen through the melt, and use of oxidizing fluxes, also could be used to control the gas condition.

Same Sand for Large Castings

QUESTION We make castings up to 8000 lb in weight in gray iron, and expect to make brass castings up to 4000 lb. We would like to know if the same sand can be used for both.

ANSWER So far as we can see, the sand used for gray iron should serve satisfactorily in producing the large brass castings. Main consideration is surface finish, and that can be taken care of by application of plumbago or similar mold coating to bridge the large interstices or pores between the sand grains, and provide a smooth surface.

Cites Vacuum Casting Methods

QUESTION One of our Spanish associates has written to us relative to modernizing its brass and bronze foundry department, and mentions that it would like to work with the process of "vacuum" casting. Can you give us information on that?

ANSWER Your inquirer is not quite clear as to what he means by vacuum casting since several possibilities come to mind. One is in connection with the investment molding process often termed the lost wax or precision molding method. In this the mold, which usually is small and encased in a steel container or flask, is placed on a table over an opening or pipe leading to a vacuum tank and pump—using a ring-type asbestos seal between table and flask. Flask and contents usually are hot and the seal is moistened sufficiently to minimize leakage. In this proc-

(*Concluded on page* 110)

Designed for Small to Medium Sized Shops

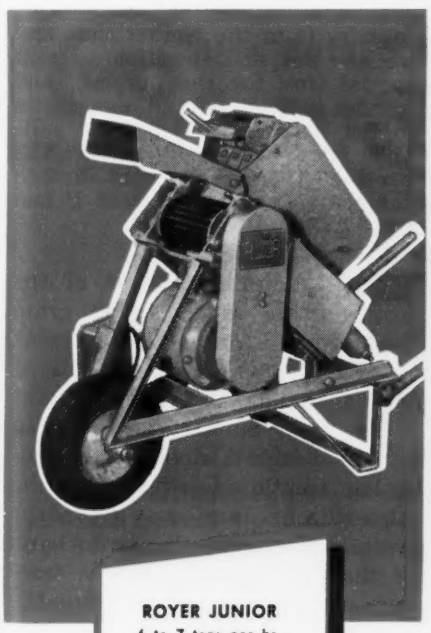
4 to 15 tons of conditioned sand per hour

The need for sand preparation equipment in small to medium sized foundries is just as great as it is in large production shops —but the machine must be designed for the job. And that *is* the case with Royer Sand Separators and Blenders. The models illustrated (the Junior, NB-2 and NC-4) are made for foundries needing a comparatively small tonnage of prepared sand . . . but definitely needing it.

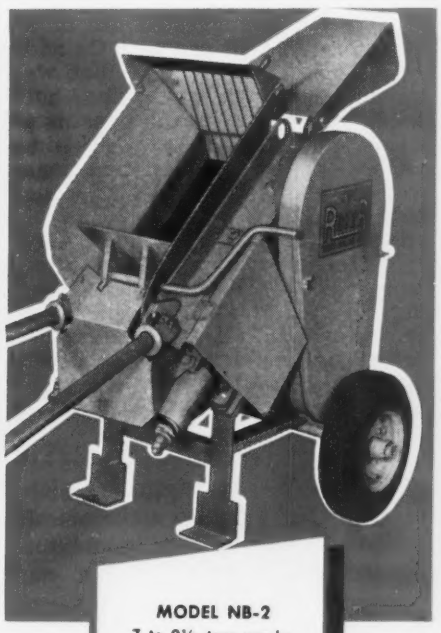
The same advantages in labor saving, cost reduction and increased production apply. And the sand will be properly conditioned —free of all contamination, thoroughly blended and mixed, double aerated.

With a Royer you will save many hours of time and cut your sand conditioning costs. Production will increase because of fewer rejects due to scabs, blows and run-outs. Your finished castings will have smoother surfaces, needing less machining, cleaning and grinding.

You profit many ways with a Royer. Write for information on the model best suited to your needs. Complete details will be sent on request.



ROYER JUNIOR
4 to 7 tons per hr.



MODEL NB-2
7 to 9½ tons per hr.

MODEL NC-4
12 to 15 tons per hr.

Export Department, 306 W. Washington Blvd.
Chicago 6, Ill., U.S.A. Cable: ASMAN

Foremost in Sand ROYER *Conditioning Equipment*

ROYER FOUNDRY & MACHINE CO. 159 PRINGLE ST. KINGSTON, PA.

(*Concluded from page* 108)

ess the flask is seated properly on the seal and, with the metal ready to be poured, a quick-opening valve to the vacuum line is opened; after a few minutes the metal is poured into the mold.

Another type of vacuum casting is that where the metal is melted in high-frequency electric furnaces. Furnace and mold are enclosed in a leakproof structure which in turn is connected to a vacuum pump. Arrangement of the furnace within the chamber is such that it can be tilted from the outside to pour metal into the mold. In this method the metal may be melted under a vacuum from the start; or the metal may be melted, then the chamber evacuated and the metal poured; or the air may be evacuated, the chamber filled with a gas such as nitrogen, and the metal melted and poured in such atmosphere.

Still another is the Bruneau process developed in France for production of finned cylinder heads for airplane engines. That uses permanent or metal molds which are arranged so that they may be attached to an evacuating system.

Core Sticking Causes Trouble

QUESTION We are using in our foundry in India a core sand mixture made of 1.5 to 2 per cent double boiled linseed oil, 0.5 to 1 per cent cereal core binder and the remainder silica sand. This mix after baking at 450° F develops 90 to 100 psi compression strength with 120 to 150 permeability and shows good collapsibility. In the green state it has sufficient bond for easy working, but has little or no flowability and does not strip clean of the corebox. We do not use any parting liquid except kerosene. Because of this we do not get cores with a smooth finish even though we use as fine a sand as possible, and the cores require considerable finishing and painting.

ANSWER Your difficulty with the green cores sticking to the boxes undoubtedly is due to the type of linseed oil being used, and perhaps it may be eliminated, or at least decreased, by the addition of some diluent which will act as a lubricant, such as fuel oil or kerosene. For example, you might try the addition of 0.25 to 0.50 per cent by weight. This addition also probably will increase the flowability of the sand. While you mention you are using kerosene, you refer to it as a parting agent, and we assume you spray or brush it on the box.

Possibly you may be able to counteract the stickiness of the linseed oil by increasing the amount of cereal binder to approximately double the amount being used or to between 1 to 2 per cent by weight. You do not mention the amount of moisture in the core mix, and if the moisture is high the sand will tend to stick in the boxes. For hand-made cores the moisture may be around 5 per cent, but for cores blown on machines the moisture should be about 2.5 to 3.0 per cent.

Making Alloy Iron Castings

QUESTION We have been asked by a customer to advise the highest per cent of chrome and nickel castings we can pour in our foundry. We have three cupolas lined to 24, 30 and 36 in.; use by-product coke, and can get our iron quite hot. Castings to be made will have to be machined and withstand as much heat as possible. In a previous reply you suggested use of a 14 per cent Ni, 6 per cent Cu and 2 per cent Cr alloy iron, but we wonder if that would be hot enough to pour in thin castings weighing 400-500 lb with $\frac{5}{8}$-in. metal thickness. Alloy additions would have to be made in the ladle—which seems to be a lot of addition. Also do you have any information on the alloy content of motor blocks? We thought of using these in the charge to obtain the alloy additions, and such information would help us in other castings since we have accumulated quite a stock of blocks over the past few years.

ANSWER We note from your letterhead that you also make aluminum and brass castings in addition to gray iron castings, and if you have a crucible furnace large enough you can melt the high-alloy iron without difficulty. Another method would be to place the required amount of the alloy materials only in a smaller crucible; heat them up as hot as possible and add to the ladle of iron. With a good furnace you can melt the nickel and copper first, and then stir in the ferrochromium (20-mesh). The molten material then is added to the ladle. With that practice, of course, you should have a definite amount of iron in the ladle and likewise of the alloying materials.

We note that you mention the castings must be machined and withstand as much heat as possible. The alloy iron mentioned can be machined due to its high nickel and copper content in combination with the chromium which would not be the case of another alloy iron containing about 1 per cent chromium and 1 per cent nickel which is employed successfully for furnace firepots, grates, etc., and which is difficult to machine.

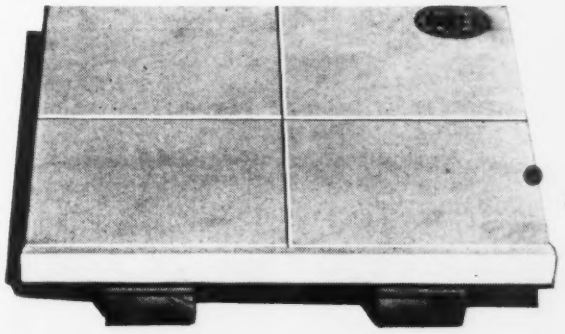
Compositions of cylinder blocks vary between the different makers, but you might figure about 0.20 to 0.40 per cent each of nickel and chromium. Best way, of course, is to have some chemical determinations made which will indicate the amounts of the elements in question.

Increasing Heat Resistance

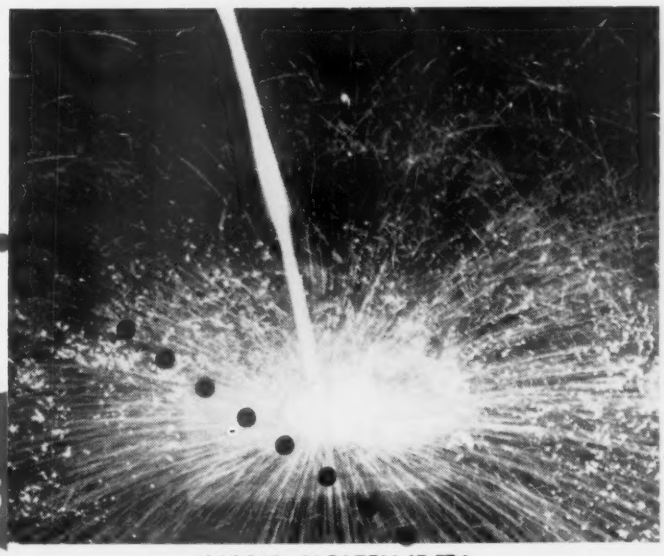
QUESTION Continuously we have difficulties with the short life of the cast iron grates used in slow combustion stoves we make. Our foundry is in the Netherlands and we are not in a position to cast special iron for the purpose, and wonder if we could add ingredients to the ladle and get a more suitable iron. Analysis shows 3.32 per cent TC, 2.54 per cent Si, 0.38 per cent Mn, 1.11 per cent P and 0.056 per cent S.

ANSWER Heat resistance of the iron you are using for the grate bars can be increased considerably by use of appreciable amounts of chromium, and we suggest about 1 per cent. Since chromium is an effective carbide stabilizer, the addition mentioned—even with the high-silicon iron—may produce white fracture in the grate bars. If that is objectionable, the fracture color may be grayed by addition of a small amount of a silicon-manganese-zirconium alloy or nickel. Amount of the former is such as to provide an addition of 0.5 per cent Si, and in the case of nickel the amount may be up to 1 per cent. In fact, some foundries in this country are making firepots for furnaces by adding 1 per cent Cr and 1 per cent Ni to stoveplate iron similar to your composition.

The New RIMCO FOUNDRY BOTTOM BOARD



Save 90% of your FOUNDRY BOARD COSTS



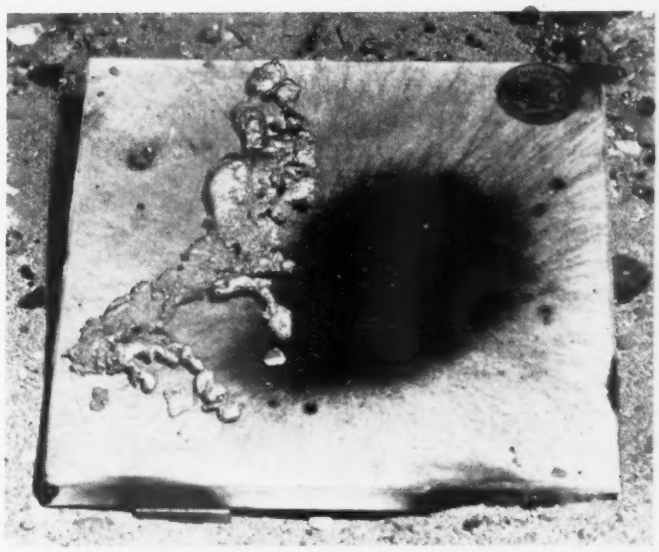
2900° F. MOLTEN IRON

The smooth fire-resistant surface and warp-free laminated construction of the Rimco Foundry Board lasts more than 10 times longer. Here's graphic proof that 2900° F. molten metal leaves only a minor surface scar! In addition, the board is reversible. Cleats, surfaced with processed RESINWOOD, assure extra long use.

- ✓ **No Deflection**
- ✓ **No Burn-outs**
- ✓ **Use Both Sides**

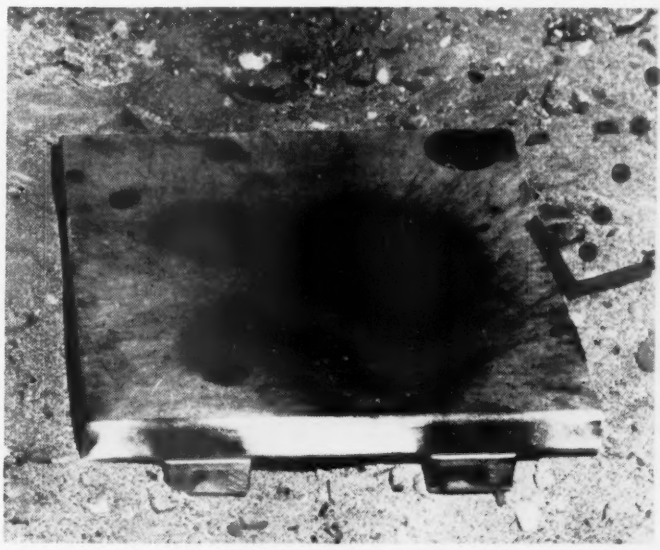
Cost-Conscious Foundrymen say:

"We cannot afford to use anything but the RIMCO Boards."



HOT METAL AFTER 3 MINUTES

LET YOUR MOLDERS TEST IT!
AND . . .
BE THE JUDGE!



SURFACE SCARRED BUT UNDAMAGED

84 STANDARD STOCK SIZES

Our Production Department stands ready to supply you with boards made to your specifications . . . if our 84 standard stock sizes are not adequate.

Manufactured by

ROCK ISLAND MILLWORK COMPANY
RESINWOOD DIVISION

Rock Island **Illinois**

Write Today For
Prices and Literature

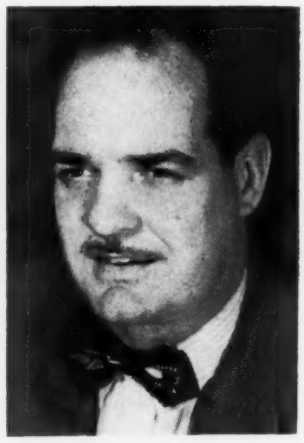
THE FEDERAL FOUNDRY SUPPLY CO.
4600 E. 71st Street Cleveland 5, Ohio
Crown Hill, W. Va. • Chicago • Detroit • Milwaukee • Richmond, Va. • Chattanooga • New York • Upton, Wyo.
IN TWIN CITIES, C. D. Gallaher, 428 Stinson Blvd., Minneapolis

MEN OF INDUSTRY

EDWIN E. POLLARD
. . . v. p., Caldwell Foundry

OTTO J. FLECK
. . . pres., Fremont Flask Co.

JOHN W. SCHNEIDER
. . . foundry mgr., Ford Motor



HAROLD C. GRANT
. . . Ford motor foundry mgr.

EDWIN E. POLLARD, until recently manager of the Alabama Pipe Co., Water Pipe Plant, Anniston, Ala., has been appointed vice president in charge of operations, Caldwell Foundry & Machine Co., Birmingham. Mr. Pollard, recently elected chairman of the Birmingham District Chapter of the American Foundrymen's Society for 1954-55, was its vice chairman last year.

♦ ♦ ♦

James S. Vanick, metallurgist, Development and Research Division, International Nickel Co., New York, was recently elected chairman of the New York section, American Institute of Mining and Metallurgical Engineers, New York. A graduate of Case Institute of Technology, Mr. Vanick received a master's degree in science from George Washington University. He joined International Nickel in 1922 following engineering tests for the British Ministry of Munitions and the U. S. Army, and service as research metallurgist for the Bureau of Standards, Washington.

♦ ♦ ♦

Geoffrey M. Rollason, since 1933 general manager of the Die Castings Division, Aluminum Co. of America, Pittsburgh, has retired following 35 years with the company. Mr. Rollason was graduated from Massachusetts Institute of Technology and joined Alcoa's Cleveland plant in 1919 where he became assistant director of research. Mr. Rollason is president of the American Die Casting Institute.

♦ ♦ ♦

Karl G. Jansson, vice president and general sales manager, Keokuk Steel Casting Co., and Mid-Continent Steel Casting Corp., has been elected to the board of directors of those firms.

Otto J. Fleck was recently elected president, Fremont Flask Co., Fremont, O., succeeding the late Charles J. Miller. Mr. Fleck joined the company in 1938 and has been vice president since 1951. He is also president-general manager, Fremont Foundry Co., Fremont, where he started as pattern shop foreman, and subsequently became foundry engineer, assistant superintendent and assistant general manager.

♦ ♦ ♦

Clyde M. Adams, secretary, Bohn Aluminum & Brass Corp., Detroit, has been appointed director of the Aluminum-Magnesium Division, BDSA, Washington, where since February he has served as deputy director and, more recently, acting director. Mr. Adams has been with the Bohn company since its formation in 1924, and has been secretary-director since 1949.

♦ ♦ ♦

Ford R. Snyder, metallurgical engineer in charge of sales development, Hickman, Williams & Co., Chicago, has been named a director of the company. Mr. Snyder was graduated from University of Iowa and prior to joining Hickman, Williams & Co., was associated with John Deere Tractor Co., Waterloo, Iowa, subsidiary of Deere & Co., Moline, Ill., from 1934 to 1947.

♦ ♦ ♦

E. H. Fries, vice president, and **W. T. McGinnis,** assistant to the president, Keokuk Electro-Metals Co., Keokuk, Iowa, have been appointed company directors. **Craig R. Sheaffer,** board chairman of W. A. Sheaffer Pen Co., has been re-appointed a director of Keokuk, a position he resigned when he became Assistant Secretary of Commerce in 1953.

John W. Schneider has been appointed manager of Ford Motor Co.'s Dearborn Iron Foundry, Dearborn, Mich. **Harold C. Grant,** since 1950 production manager of the Dearborn Specialty Foundry, has succeeded Mr. Schneider there as manager. Mr. Schneider has been in the Rouge plant foundries since 1925 and was general superintendent of the Dearborn Iron Foundry until 1950 when he set up the Specialty Foundry. Mr. Grant joined Ford in 1933 as a machinist in the casting machine plant's experimental department and was superintendent of small parts coremaking in the Dearborn Iron Foundry until 1950.

♦ ♦ ♦

William R. Moffitt has been named vice president - technical director, Chemical Division, Borden Co., New York. Mr. Moffitt was graduated from University of Pittsburgh and in 1938 joined Borden's chemical laboratories in Bainbridge, N. Y. He became chief chemist of the Seattle development staff in 1948, western technical director in 1950, and last year was manager of the Chemical Division's West Coast operations in Seattle.

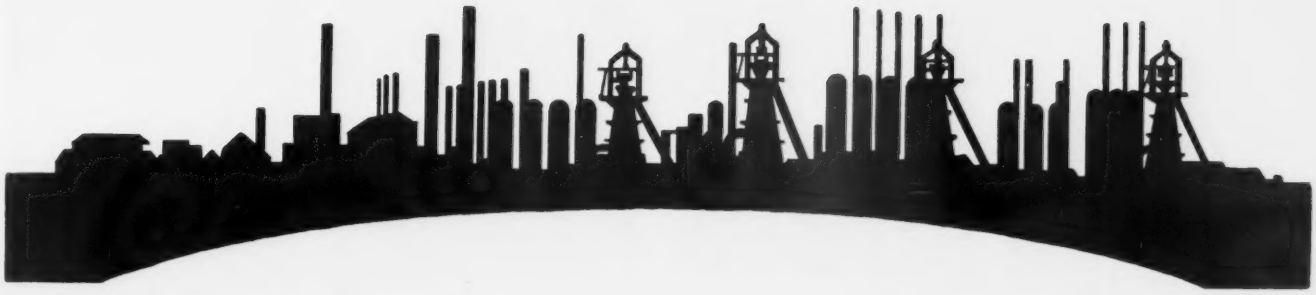
♦ ♦ ♦

D. E. Bender, since 1949 assistant supervisor of the expediting section, purchasing department, Allis-Chalmers Mfg. Co., Milwaukee, has been appointed assistant purchasing agent, foundry products and supplies section.

♦ ♦ ♦

Franklin F. Bogardus has been named Chicago district manager, Roots-Connersville Blower, Connersville, Ind., division of Dresser Indus-

(*Continued on page* 114)



Customers Come First at WOODWARD

Let us quote you on the grade of

Uniform

WOODWARD IRON

best suited to your requirements

Malleable grades available

Your inquiries will receive the prompt attention of our staff of trained metallurgists.

For quotations, write or call our
Sales Department, Woodward, Ala.

Phone Bessemer, Ala. 5-2491

or Sales Agents for territory north of Ohio River:
HICKMAN, WILLIAMS & COMPANY with Sales Branches at—

609 Bona Allen Building, Atlanta 3, Ga.; 230 North Michigan Avenue, Chicago 1, Ill.; First National Building, P. O. Box 538, Cincinnati 1, Ohio; 1154 Union Commerce Building, Cleveland 14, Ohio; 1203 Ford Building, Detroit 26, Mich.; P. O. Box 335, Duluth 1, Minn.; 412 Guaranty Building, Indianapolis 4, Ind.; 407 Foshay Tower, Minneapolis 2, Minn.; 70 Pine Street, New York 5, N. Y.; 1500 Walnut Street Building, Philadelphia 2, Pa.; 1910 Clark Building, Pittsburgh 22, Pa.; 796 Arcade Building, St. Louis 1, Mo.

Woodward Iron Company

WOODWARD, ALABAMA

Independent Since 1882

MEN OF INDUSTRY

CHARLES YAKER
. . . Misco plant mgr.

JOSEPH H. CADIEUX
. . . Misco plant mgr., Detroit

ARTHUR J. HARLAN
. . . named resident manager

GEORGE K. DREHER
. . . Steel Founders' secretary

(*Continued from page* 112)

tries, Dallas, Tex., to direct sales in Wisconsin, Minnesota, Iowa and northern Illinois. **Richard L. Tannehill** has succeeded Mr. Bogardus as Cleveland district manager, covering Ohio, Indiana, West Virginia and Kentucky.

♦ ♦ ♦

Joseph H. Cadieux has been named manager of the Detroit plant, and **Charles Yaker,** manager of the Whitehall, Mich., plant, Misco Precision Casting Co., Detroit. Mr. Cadieux was formerly associated with Ford Motor Co.'s Tractor and Implement Division. Mr. Yaker has been Misco's production manager in Detroit.

♦ ♦ ♦

Frank L. LaQue has been elected vice president, International Nickel Co., New York, and manager of the Development and Research Division, succeeding **Thomas H. Wickenden,** who has retired but who will act as consultant on special projects. Mr. LaQue joined the division after graduation from Queen's College in 1927 and has headed its corrosion engineering section since 1945. **O. B. J. Fraser** and **Donald J. Reese** will serve as assistant managers of the division. Also a graduate of Queen's University, Mr. Fraser joined the company in 1917 and has served in its plants in Canada and United States, being head of the Bayonne, N. J., research laboratory for 8 years. He has been assistant manager of the Development and Research Division since 1947. Mr. Reese, a graduate of University of Michigan, since 1947 has had charge of the research division's technical field sections. He has headed the company's iron and nonferrous casting section since 1945 and its ductile iron section since 1948. Mr. Wickenden, also a Michigan graduate, joined the company in 1922 and had been vice president for 6 years. He became manager of development and research in 1943.

♦ ♦ ♦

Arthur J. Harlan has been made resident manager of Hickman, Williams & Co. at Cleveland. Mr. Harlan is a native of Cleveland and has been connected with Hickman, Williams for 28 years. He is a past secretary of the Northeastern Ohio Chapter of AFS and currently is a director.

♦ ♦ ♦

George K. Dreher has been named secretary, Steel Founders' Society of America, Cleveland. Mr. Dreher attended Lawrence College, Appleton, Wis., and in 1930 joined Ampco Metal Inc., Milwaukee, where he became vice president-manufacturing. Early in 1947 he was appointed the first executive director of the newly formed Foundry Educational Foundation, Cleveland, where he played a prominent part in rapid development of that organization. For the past year he has been in charge of foundry operations and a director of Waukesha Foundry Co., Waukesha, Wis. Mr. Dreher is a past president of the Wisconsin Chapter of the AFS and a former national AFS director.

♦ ♦ ♦

R. L. Springfield, of Gay Sales Co., Houston, Tex., was recently appointed sales representative in the Houston-Gulf Coast area for Claud S. Gordon

(*Continued on page* 116)

FRANK L. LA QUE
. . . International v. p.

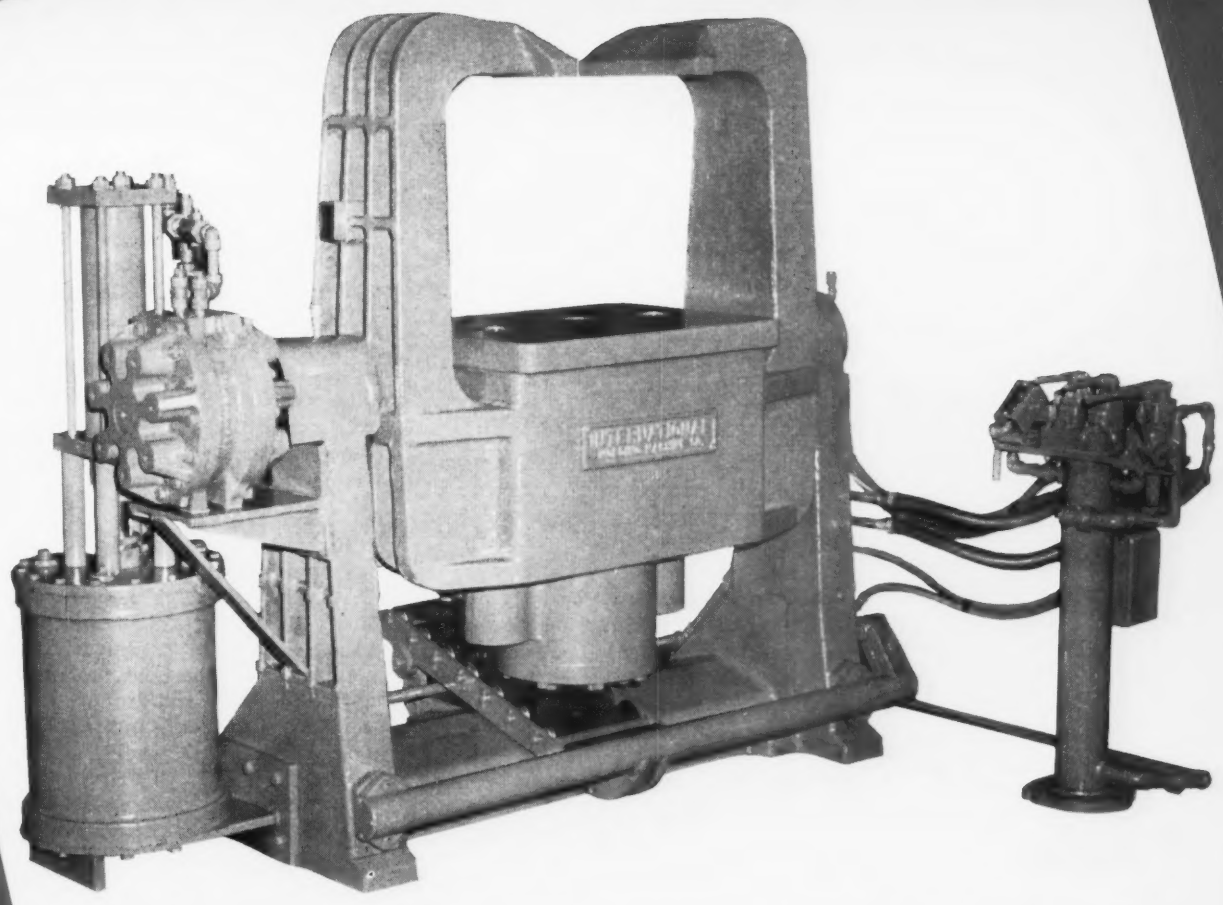
O. B. J. FRASER
. . . Inco assistant manager

DONALD J. REESE
. . . assistant manager, Inco

R. L. SPRINGFIELD
. . . Claud S. Gordon sales

international

REJS



JOLT, SQUEEZE, ROLLOVER, DRAW MACHINE

Double jolt squeeze—positive hydraulic power rollover completely power operated—actuation by air—rugged—sturdy—positive action—automatic cycle control available.

by INTERNATIONAL

MOLDING MACHINE CO.

LA GRANGE PARK, ILLINOIS

KURT S. SEALANDER
. . . joins Hills-McCanna Co.

LEONARD N. McKIBBEN
. . . Osborn New England sales

EARL B. SMITH
. . . Osborn assistant mgr.

J. DOYLE ROBBINS
. . . machine sales, Osborn

(*Continued from page* 114)

Co., Chicago. Prior to joining Gay Sales Co., Mr. Springfield was associated with Shell Oil Refinery, Deer Park, Tex., and Manning, Maxwell & Moore Inc., Muskegon, Mich.

♦ ♦ ♦

Kurt S. Sealander recently joined the supervisory staff, Foundry Division, Hills-McCanna Co., Chicago, as chief metallurgist. A graduate of University of Minnesota, Mr. Sealander was formerly chief metallurgist, Magnesium Foundry Division, Aluminum Co. of America, Buffalo.

♦ ♦ ♦

Robert V. Osborne, newly elected president of the Wisconsin Chapter of the American Foundrymen's Society for 1954-55, is vice president, Lakeside Malleable Castings Co., Racine, Wis. Mr. Osborne joined U. S. Steel Corp., following graduation from Northwestern University. In 1941 he joined his father, W. V. Osborne, at the Lakeside company and in 1946 became vice president of manufacturing.

Earl B. Smith has been appointed assistant manager of the Machine Division, Osborn Mfg. Co., Cleveland. **J. Doyle Robbins,** formerly assistant to the vice president of the division, has succeeded Mr. Smith as sales engineer in the division's Ohio and West Virginia area. **Leonard N. McKibben,** formerly supervisor of sales service, has been named sales engineer in the New England territory. Mr. Smith has been with the Osborn organization 26 years. Mr. Robbins joined the company in 1948 following graduation from Case Institute of Technology. Mr. McKibben, a graduate of Massachusetts Institute of Technology, has been with the firm since 1951.

♦ ♦ ♦

John L. Worrilow, formerly assistant to the president, Lebanon Steel Foundry, Lebanon, Pa., has been named secretary, succeeding **Harry L. Quinn,** who continues as general manager of the company.

♦ ♦ ♦

Russell J. O'Neil has been appointed field engineer in the Detroit office, Norton Co., Worcester, Mass. Mr. O'Neil joined the company in 1945 and previously was in the Detroit and Cleveland offices.

♦ ♦ ♦

Theodore D. Trackler, permanent mold and magnesium foundry, Aluminum Co. of America's Cleveland Works, was recently elected president of the company's local 25-Year Club. Other officers elected for the coming year to serve the veterans' organization are: **Stanley R. Kuhns,** vice president; **A. J. Kraft,** secretary-treasurer; **E. M. Gingerich** and **George Moore,** executive committee members.

♦ ♦ ♦

Kenneth W. Cunningham, general manager-production, and **Jerry G. Pritz,** general sales manager, Ohio Ferro-Alloys Corp., Canton, O., have been elected vice presidents. Mr. Cunningham joined the company in 1945, became manager of the Tacoma, Wash., plant, and in 1950 was named production manager. Mr. Pritz, son of the late L. G. Pritz, a founder and former president of Ohio Ferro-

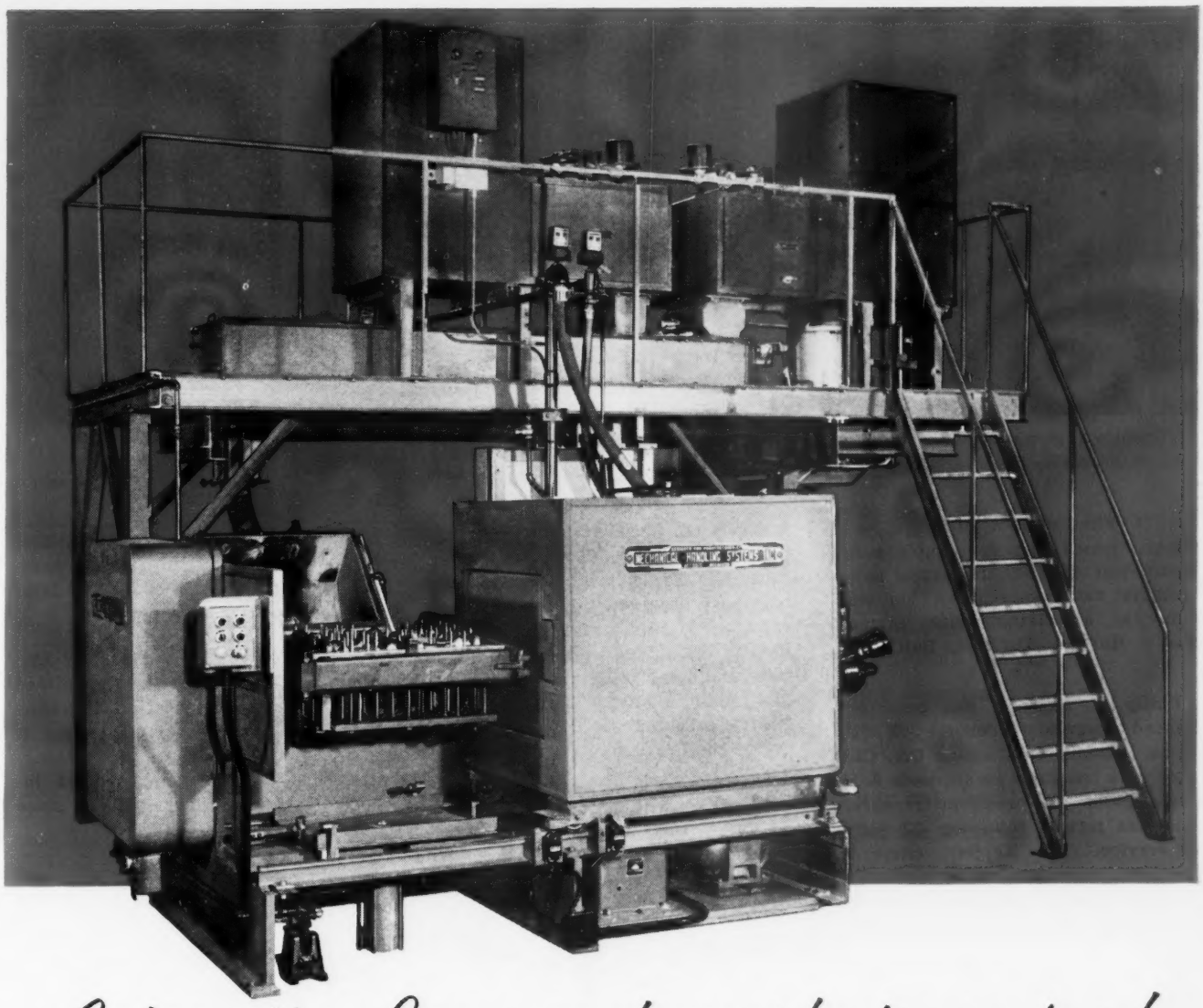
(*Continued on page* 118)

ROBERT V. OSBORNE
. . . heads Wisconsin Chapter

RUSSELL J. O'NEIL
. . . Norton sales, Detroit

KENNETH W. CUNNINGHAM
. . . v. p. Ohio Ferro-Alloys

JERRY G. PRITZ
. . . Ohio Ferro-Alloys v. p.



Automatic...from sand supply to curing!

THE NEW MHS SHELL MOLDING MACHINE

- Produces 40—22″ x 28″ shells per hour
- Universal pattern holder and stripper fit any pattern
- Pattern holder has no springs; separate stripper opens cam lock to release ejector pins
- Electrically operated; no hydraulic controls, ends fire hazards
- Gas oven rolls into position to surround entire pattern for even curing
- Automatic sand feed holds mixture level in hopper
- Sand mixture gravity-fed evenly to pattern with sand bridge
- Cycle timing can be set for any type of mold

The Only Manual Operation!

Air-powered stripper plate lifts finished shell off pattern for removal by operator.

Get complete details on the revolutionary new MHS automatic Shell Molding Machine. Write today!

Mechanical Handling Systems Inc.

AND SUBSIDIARIES

4630 Nancy Ave. • Detroit 12, Michigan

Offices in Principal Cities • FACTORIES: Detroit, Mich. • Fairfield, Iowa • Albany, N. Y. • Windsor, Ontario

PHILIP R. KEPHART
. . . Jones Foundry executive

DONALD L. SHIRLEY
. . . Link-Belt district mgr.

VICTOR E. VALLET
. . . receives honorary degree

J. A. OGLE
. . . precision castings sales

(*Continued from page* 116)
Alloys, joined the company's sales department in 1947, becoming sales manager two years later. He was formerly associated with Armco Steel's Rustless Division, Baltimore.

♦ ♦ ♦

Philip R. Kephart has been appointed secretary-treasurer, W. A. Jones Foundry & Machine Co., Chicago. As treasurer he succeeds **J. B. Christerson,** vice president-treasurer, who has retired following 22 years of service. Mr. Kephart came to the Jones organization in 1952 from Western Electric Co., New York.

Donald L. Shirley was recently appointed Seattle district manager, Link-Belt Co., Chicago. Mr. Shirley previously served with Link-Belt from 1914-1944, starting in the Seattle office, his present headquarters, and later was in the Indianapolis chain plant, Philadelphia and Seattle sales offices, as well as manager of the Portland, Oreg., office.

♦ ♦ ♦

Victor E. Vallet, president, Giffels & Vallet Inc., L. Rossetti, Detroit, was recently awarded the honorary degree of Doctor of Engineering, by University of Colorado, from which he was graduated in 1916. In 1925 Mr. Vallet formed his own engineering company, Louis Rossetti later joining the firm as architect.

♦ ♦ ♦

J. A. Ogle, Jack Ogle & Co., Seattle, was recently appointed Washington representative, Precision Castparts Corp., Portland, Oreg. A graduate of University of Washington, Mr. Ogle has represented industrial firms in the northwest since 1949.

♦ ♦ ♦

George T. Fraser has been appointed western sales manager, and Dwight W. Kaufmann, eastern sales manager, Rem-Cru Titanium Inc., subsidiary of Crucible Steel Co., and Remington Arms Co., Pittsburgh. Mr. Fraser was formerly sales manager for Rem-Cru, in Midland, Pa. Mr. Kaufmann, a graduate of Pennsylvania State University, became assistant sales manager in January, when he was transferred from Crucible's central metallurgical office.

♦ ♦ ♦

Milton J. Weber, vice president-procurement, Frank G. Hough Co., Libertyville, Ill., has been made a company director. He has been with the company since 1941 and a vice president since 1952. **Thomas F. Flood** has been named vice president-manufacturing.

♦ ♦ ♦

Gordon P. Larson was recently elected president of the Air Pollution Control Association at its annual convention in Chattanooga, Tenn. Mr. Larson is director of the Los Angeles County, Calif., Air Pollution Control District.

♦ ♦ ♦

F. A. Upper, manager, sales engineering, Carborundum Co., Niagara Falls, N. Y., has been appointed to the Standards Council of the Ameri-

(*Continued on page* 120)

HARRY N. PATRONIK
. . . Pangborn dust control

ERIC J. FANTON
. . . dust control, Pangborn

Eric J. Fanton has been named dust control design and development engineer, Pangborn Corp., Hagerstown, Md. Mr. Fanton was born and educated in Leicester, England, and for 16 years was associated with Dallow, Lambert & Co. Ltd., there, as design and development engineer, and for the past 5 years as chief draftsman. **Harry N. Patronik,** since 1946 associated with the dust control department, Whiting Corp., Harvey, Ill., has been appointed dust control application engineer at Pangborn Corp. Mr. Patronik studied mechanical engineering in the Chicago area and in 1941 entered Whiting's engineering department.

"I'll get to BUFFALO *ANY* WAY

...to get those BETTER BUFFALO PATTERNS"

Get here any way you can,
Once you do, you'll be a fan
Of pattern making super fine,
That saves you money all the time.

Our Engineers plan each detail,
Of jobs, so that we never fail
To produce equipments that really fit,
Your shop and schedule without a slip.

Fine Craftsmanship (so rare these days),
Will save you money many ways.
Scrap ratios hit some all-time lows,
And high production really flows.

On any work where you really care,
Good gravy, man, don't tear your hair,
Now you know just where to go,
Bring those fussy jobs to Buffalo.

Be our guest Just let us know when you are coming to Buffalo on pattern business. One of our cars will meet you at your plane or train and transport you to our club where you will be our guest during your stay.

Production and Experimental Pattern Equipment • Shell Mold Pattern Equipment and Engineering • Wood and Plastic Models • Jigs, Templates and Target Fixtures • Permanent Molds • Forging and Stamping Dies • Dies for Injection and Reinforced Plastics Molding • Special Precision Parts • Special Machinery and Tooling • Metallizing • Engineering Drawing Service

BUFFALO PATTERN WORKS, INC.
832 HERTEL AVE., BUFFALO 16, N. Y.
DESIGNERS AND MANUFACTURERS OF PATTERN EQUIPMENT FOR OVER HALF A CENTURY

MEN OF INDUSTRY

RALPH E. VAN DEVENTER
. . . joins Alloy Engineering

FRANK J. HALLIGAN
. . . joins Doran Bronze Co.

JACK J. SPURRIER
. . . refractory sales, Toledo

J. L. PISCHKE
. . . heads American MonoRail

(*Continued from page* 118)

can Standards Association, representing the Grinding Wheel Institute. Mr. Upper also is a member of the Mechanical Standards Board of the association. He has served 30 years with the Carborundum Co.

♦ ♦ ♦

Ralph E. Van Deventer has been made chief metallurgist, Alloy Engineering & Casting Co., Champaign, Ill. Following graduation from University of Michigan in 1931, Mr. Van Deventer joined Packard Motor Car Co., Detroit, as a chemist. In 1936 he became chief chemist, three years later car and marine engine metallurgist, and since 1945 has been chief metallurgist. Mr. Van Deventer is active as a member of various technical committees of the Society of Automotive Engineers.

♦ ♦ ♦

Richard W. Wilson, for the past 4 years chief metallurgist-assistant foundry superintendent, American Hoist & Derrick Co., St. Paul, has been appointed Chicago sales engineer, Electro Metallurgical Co., division of Union Carbide & Carbon Corp., New York. Mr. Wilson attended University of California and was graduated from University of Minnesota. Previously he was in the metals research department, Armour Research Foundation, Illinois Institute of Technology, Chicago.

♦ ♦ ♦

Frank J. Halligan, until recently assistant manager, Foundry Products Division, Baldwin-Lima-Hamilton Co., Philadelphia, has been appointed sales manager, Doran Manganese Bronze Co., Brooklyn, N. Y., subsidiary of Columbian Bronze Corp., Freeport, L. I. Mr. Halligan attended Drexel Institute and joined Baldwin-Lima-Hamilton in 1934.

♦ ♦ ♦

L. D. Richardson has been named national sales and service supervisor, Eutectic Welding Alloys Corp., Flushing, N. Y., in charge of sales, sales training and service in the United States and Canada. Mr. Richardson joined the company 9 years ago as a district engineer. Previously he was chief welding engineer with U. S. Engineers, Manhattan Project, Oak Ridge, Tenn. Prior to that he was associated with St. Johns River Shipbuilding Corp., Jacksonville, Fla., and W. A. Bechtel Corp., San Francisco.

♦ ♦ ♦

Jack J. Spurrier has been named district sales manager, A. P. Green Fire Brick Co., Mexico, Mo., with headquarters in Toledo, O. Mr. Spurrier, associated with the company many years, was recently a sales supervisor in the home office.

♦ ♦ ♦

J. L. Pischke has been elected president, American MonoRail Co., Cleveland, succeeding **J. P. Lawrence,** who has become chairman of the board. Mr. Pischke joined MonoRail in 1936, serving successively as secretary, treasurer, director, and since 1951 as executive vice president. Mr. Lawrence, one of the company's founders, was vice president from its organization in 1926, until 1944, when he became president. **C. L. Fell,** sales manager of the textile division, and **Carl Harris,** vice president- production, have been named company directors.

♦ ♦ ♦

Dave Alexander has been appointed sales representative in the Philadelphia territory for Miller Fluid Power Co., Melrose Park, Ill. Mr. Alexander is a mechanical engineering graduate of Drexel Institute of Technology. **Wilfred A. Pehl** has joined the Miller organization as a field engineer in the Cleveland territory.

♦ ♦ ♦

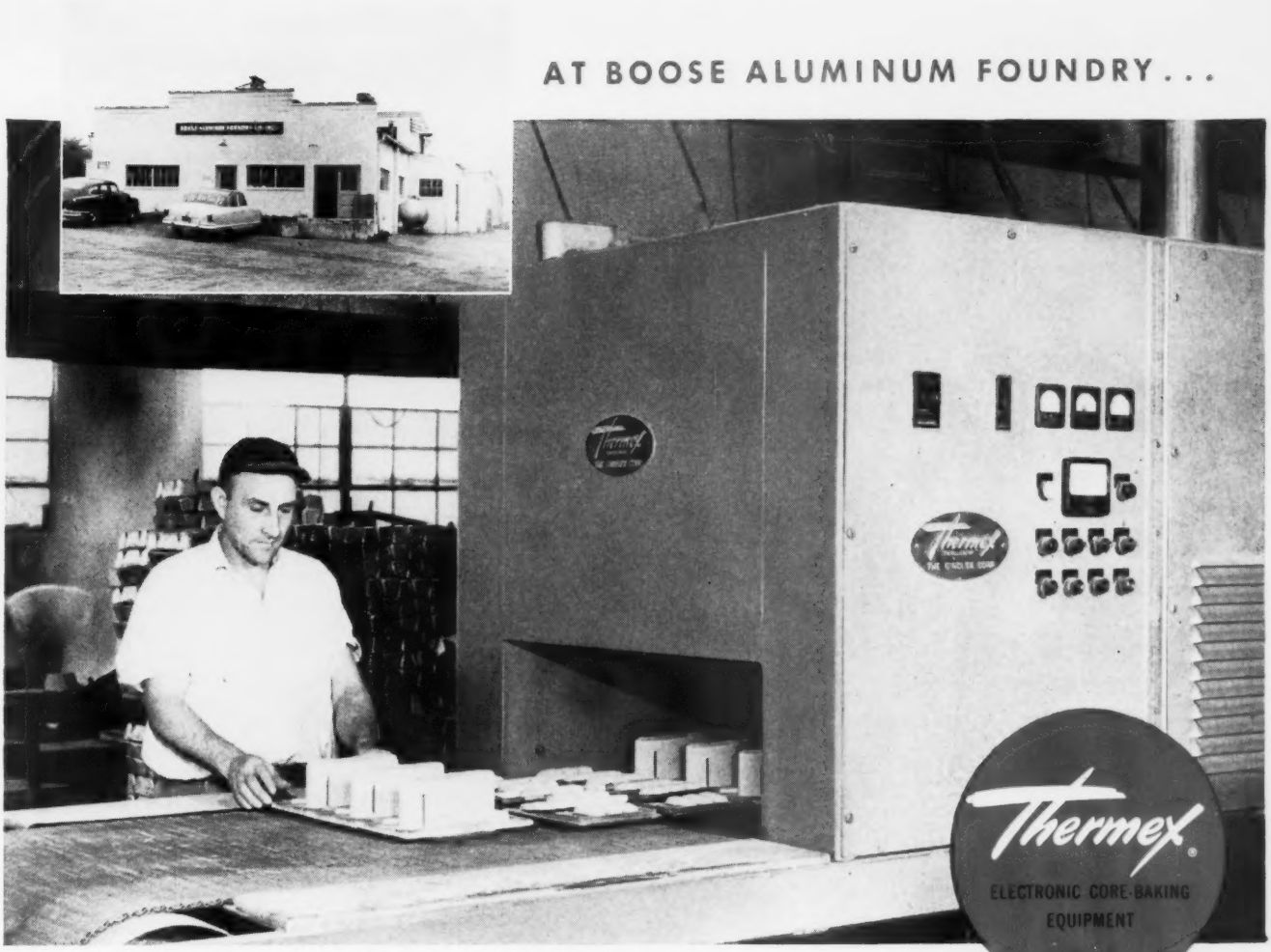
C. A. Pickett has been elected vice president-director, Illinois Engineering Co., Chicago. Mr. Pickett has been general manager of the engi-

(*Concluded on page* 122)

RICHARD W. WILSON
. . . Electromet sales, Chicago

L. D. RICHARDSON
. . . Eutectic Welding sales

AT BOOSE ALUMINUM FOUNDRY . . .



Dielectric baking installation at Boose consists of two 15 KW THERMEX Core Baking Units in tandem. Cores vary from ½ ounce to more than 20 pounds.

Better cores...Lower costs...Cleaner Conditions

This progressive foundry at Reamstown, Pa., reports these benefits from dielectric baking with THERMEX* Core Baking Equipment:

BETTER CORES. Uniform heat throughout core eliminates over-baking and distortion. Result: smoother, more accurate castings.

LOWER COSTS. Continuous, high-speed baking boosts output per manhour 33%. Saves production and storage space. Cuts handling.

IMPROVED WORKING CONDITIONS. Operation is smokeless. Unit does not give off external heat. Simple, push-button control.

Find out how THERMEX Core Baking Equipment can improve *your* operations. Mail the coupon for booklet. The Girdler Company, Thermex Division, Louisville 1, Kentucky. *THERMEX—Trade-Mark Reg. U.S. Pat. Off.

The
GIRDLER
Company

A DIVISION OF NATIONAL CYLINDER GAS COMPANY
THERMEX DIVISION

THE GIRDLER COMPANY, Thermex Division
224 East Broadway, Louisville 1, Kentucky

Please send me the new booklet on Electronic Core-Baking

Name _____

Position _____

Company _____

City _____ *State* _____

G. CLYMER BROOKE
. . . *Birdsboro Steel pres.*

JOHN E. McCAULEY
. . . *Birdsboro Steel chairman*

ARLAN L. WENTZEL
. . . *Birdsboro v. p.*

JAMES M. HEPPENSTALL
. . . *v. p., Birdsboro*

(*Concluded from page* 120)

neering company since it was acquired last year by American Air Filter Co., Louisville. **John Hellstrom,** vice president and director of sales of the parent company, was also elected a director of Illinois Engineering Co.

♦ ♦ ♦

John E. McCauley, for 20 years president, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., has been elected chairman of the board. **G. Clymer Brooke** has succeeded Mr. McCauley as president, after a year as executive vice president. **James M. Heppenstall** and **Arlan L. Wentzel** have become vice presidents, continuing as treasurer and works manager, respectively. Mr. McCauley, who joined the company in 1910 as assistant general manager, became vice president-general manager in 1919. Mr. Brooke, with Birdsboro since 1931, became assistant to the vice president in 1937, assistant secretary in 1941, assistant to the president in 1944, and vice president the following year. Mr. Heppenstall was appointed comptroller in 1945 and treasurer in 1951. Mr. Wentzel started as a company plant supervisor in 1937, later becoming assistant vice president-works manager. **Edward T. Peterson,** vice president-engineering, and **Lester E. Leinbach,** secretary, have been re-elected.

♦ ♦ ♦

Roswell B. Strong, vice president, Homer Foundry Corp., Coldwater, Mich., has retired following 45 years with the company. Mr. Strong joined the company when it was founded in Homer, Mich., by his father, the late Samuel D. Strong. In 1919 the plant was moved to Coldwater. His chief activities have been in sales.

♦ ♦ ♦

C. R. Seybold has been named personnel director, Motor Castings Co., Milwaukee and West Allis, Wis. Previously Mr. Seybold was associated with Allen-Bradley Co., Milwaukee.

♦ ♦ ♦

Crawford B. Murton has joined the sales department, Vesuvius Crucible Co., Swissvale, Pa. He was formerly sales representative of the refractory division, Kaiser Aluminum & Chemical Sales Inc., Oakland, Calif.

Pangborn Grant To Assist Educational Work

The $50,000 educational grant to the American Foundrymen's Society made recently by Thomas W. Pangborn, president, Pangborn Corp., Hagerstown, Md., is believed to be the largest single educational endowment granted by any organization in the foundry industry. The fund, given in the names of Mr. Pangborn and John C. Pangborn, vice president of the Pangborn Corp., is to be used for scholarship purposes and administered through the local AFS chapters.

In purpose, the Pangborn grant closely parallels the objectives of the recently launched AFS educational program, which is concentrated at the secondary level and intended to make the youth of the country conscious of the career opportunities available in the metal castings field.

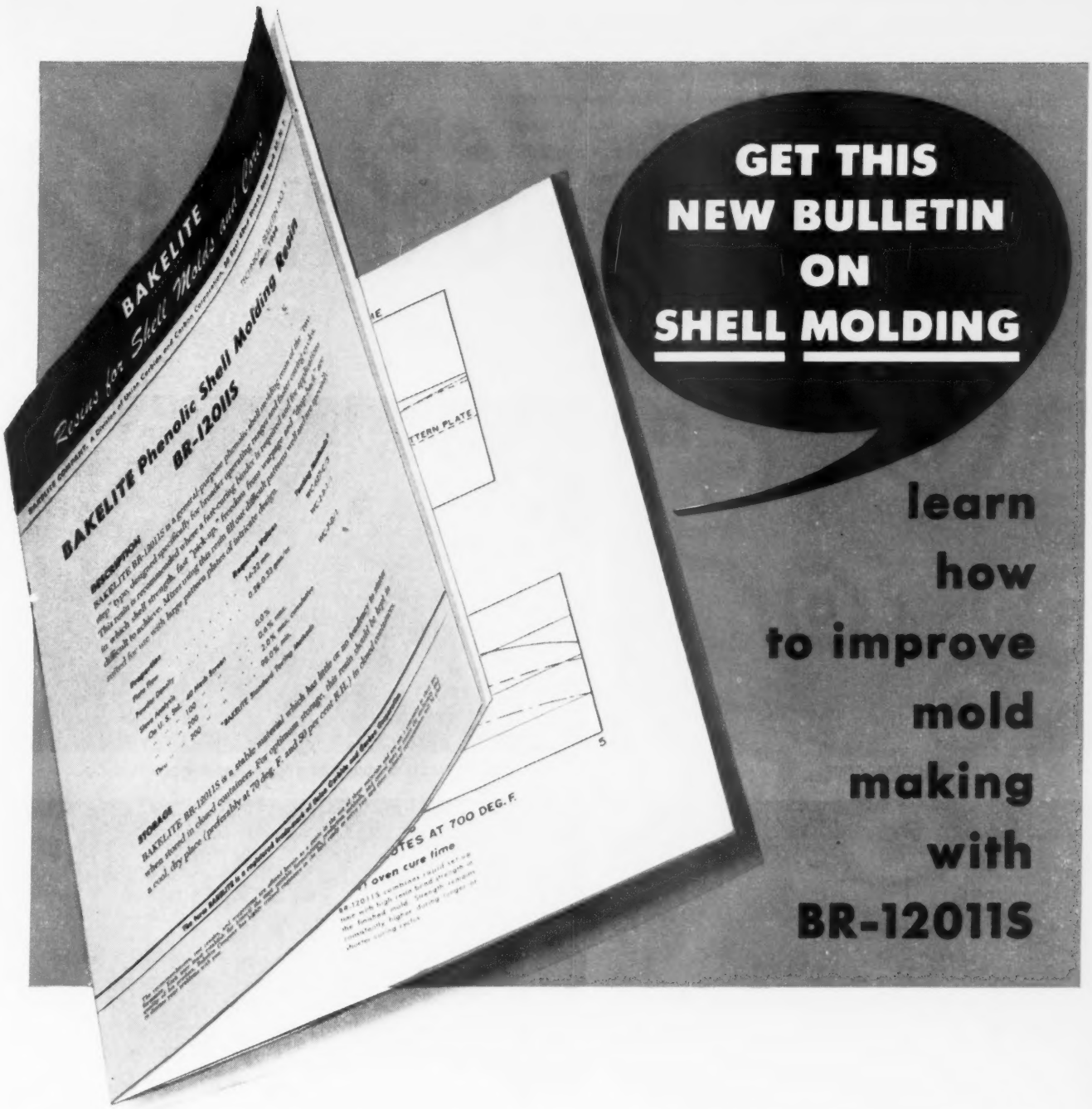
This AFS educational program will augment the work of the Foundry Educational Foundation, established in 1947 to develop better foundry facilities and curriculums in engineering schools so as to attract graduate engineers into the foundry industry. The work of the FEF is now recognized in educational circles throughout the country, and the program of AFS is a natural corollary of the continued interest of the foundry field to bring young men into the industry.

Well known for his philanthropies, Thomas W. Pangborn is chairman of the Pangborn Foundation; he is on the advisory boards of two Maryland hospitals, a trustee of Catholic University of America, and a member of the advisory council, science and engineering, University of Notre Dame.

Safety Council Publishes Woodworking Manual

National Safety Council has published a book, *Jig and Fixture Design for Woodworking Safety*, containing more than 100 pages and 61 illustrations showing in detail jigs and fixtures that support stock against a cutting edge, enabling operators to work more efficiently and with greater safety. Beginning with the simple push stick for feeding stock into a circular saw, the book progresses to more intricate devices designed for use on saws, jointers, shapers, routers, and belt sanders.

The book is 8½ x 11 in. and bound in heavy paper. It is priced at $1.75. Quantity prices may be obtained by writing the National Safety Council, 425 North Michigan Ave., Chicago 11.



Foundrymen should get the performance facts on BAKELITE Phenolic Resin BR-12011S, developed especially for making shell molds. BR-12011S means faster mold production—molds reach minimum usable strength faster than with ordinary resins. They retain their strength longer during the curing operation, giving more leeway in curing time. They resist distortion on ejection from the pattern plate, so that finished mold halves are more closely matched.

The uniformity of BR-12011S is ensured by strict quality control procedures. Highly trained Bakelite Company engineers are ready to assist you in applying BR-12011S to your shell mold production.

These points are described in the new technical bulletin released by Bakelite Company and available to you without obligation. Oven cure temperatures, oven cure time, apparent density and melt viscosity are some of the points covered by this bulletin.

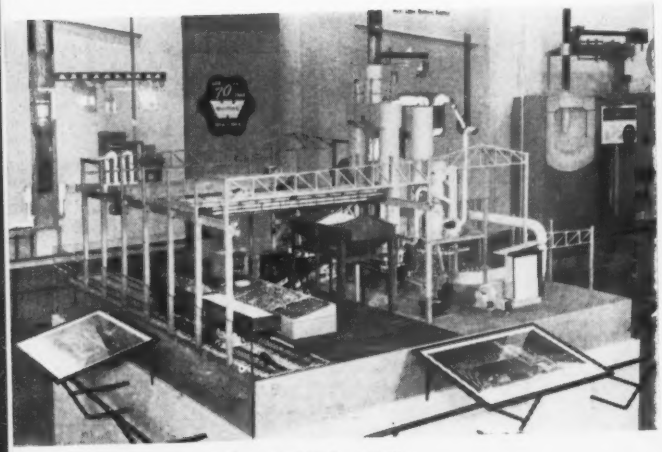
For your copy of this new bulletin, write Dept. XN-29.

BAKELITE
TRADE-MARK
PHENOLIC RESINS FOR SHELL MOLDING

TRADE MARK

BAKELITE COMPANY
A Division of
Union Carbide and Carbon Corporation
UCC
30 East 42nd Street, New York 17, N. Y.
In Canada: Bakelite Company
Division of Union Carbide Canada Limited
Belleville, Ontario

Seen at the FOUNDRY



WHITING CORP.

DETROIT ELECTRIC FURNACE DIV., KUHLMAN ELECTRIC CO.

HARRY W. DIETERT CO.

HICKMAN, WILLIAMS & CO.

THE MOULDER'S FRIEND

CLEVELAND FLUX CO.

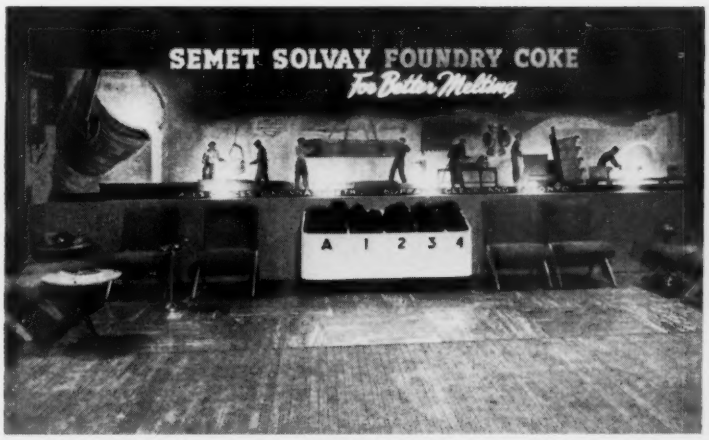
SHOW

To give those readers who were unable to attend the recent AFS Foundry Show in Cleveland a quick look at some of the many interesting and attractive exhibits conducted there, *Foundry* presents on this and subsequent pages views of a number of the booths.

These photographs were supplied through the courtesy of *Foundry* advertisers. The large number of pictures received makes it necessary to reproduce only a portion of them in this issue. The remainder will be shown in the August issue.

INTERNATIONAL NICKEL CO.

HYDRO-BLAST CORP.



SEMET-SOLVAY DIV., ALLIED CHEMICAL & DYE CORP.

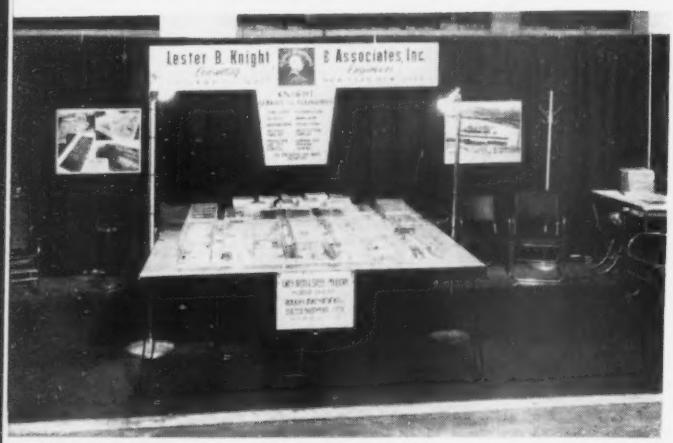
GENERAL ELECTRIC CO.

MARTIN ENGINEERING CO.

MEEHANITE METAL CORP., CROFT PROCESS DIV.

AMERICAN WHEELABRATOR & EQUIPMENT CORP.

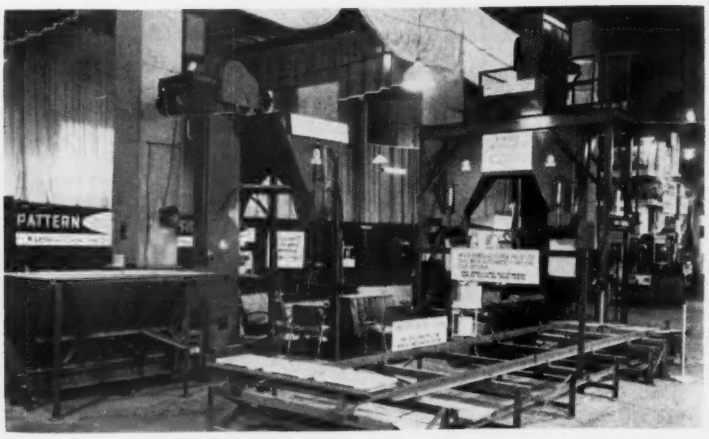
BAKER-LULL CORP.



LESTER B. KNIGHT & ASSOCIATES INC.

ROYER FOUNDRY & MACHINE CO.

SOLVAY PROCESS DIV., ALLIED CHEMICAL & DYE CORP.



NEWAYGO ENGINEERING CO.

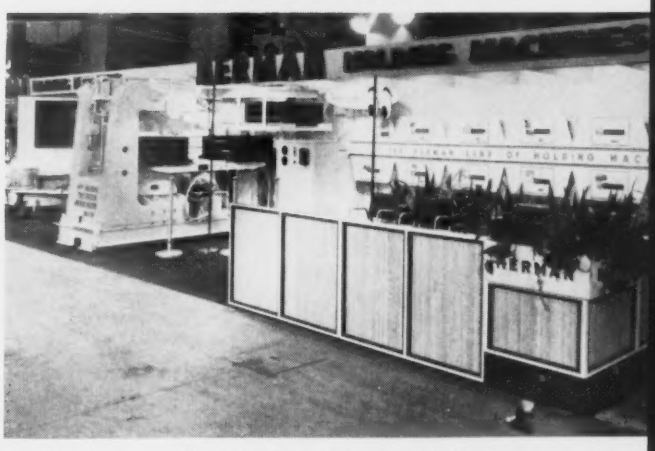
BLASTCRETE SERVICE CO.

DOW CORNING CORP.

PENINSULAR GRINDING WHEEL CO.

CLEVELAND METAL ABRASIVE CO.

INDUCTION HEATING CORP.



HERMAN PNEUMATIC MACHINE CO.

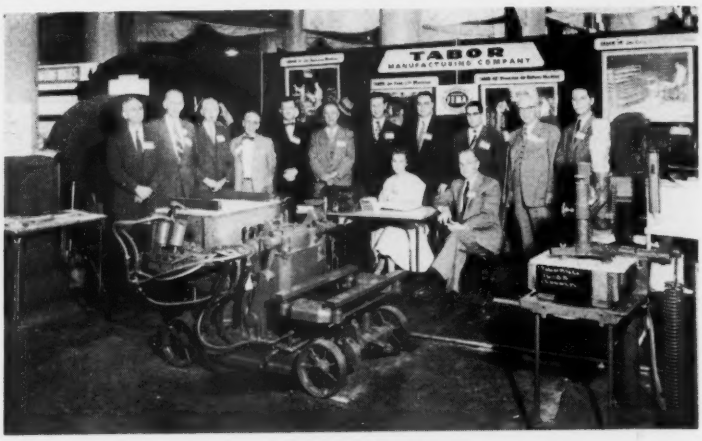
LINK-BELT CO.

BLACK, SIVALLS & BRYSON INC.

GERWIN INDUSTRIES INC.

APEX SMELTING CO.

C. O. BARTLETT & SNOW CO.



TABOR MFG. CO.

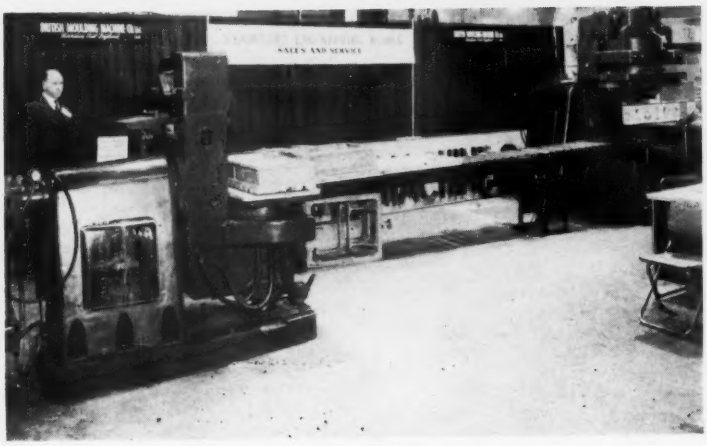
STERLING ABRASIVES DIV., CLEVELAND QUARRIES CO.

AMERICAN AIR FILTER CO.

STANDARD HORSE NAIL CORP.

I. SCHUMANN & CO.

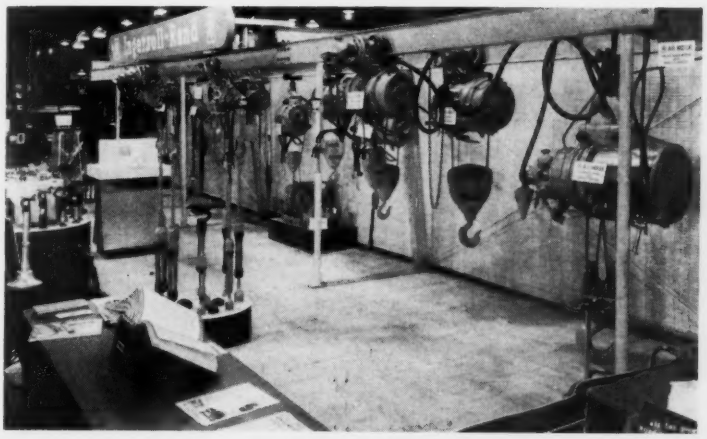
AJAX ELECTROTHERMIC CORP., AJAX ELECTRIC FURNACE CORP.



BRITISH MOULDING MACHINE CO. LTD.

ARCHER-DANIELS-MIDLAND CO.

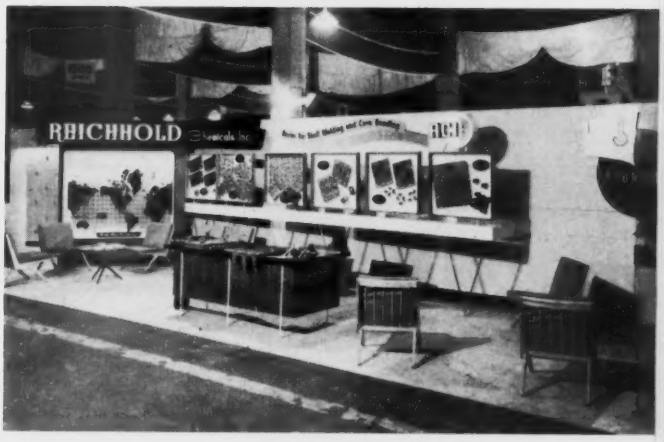
NATIONAL ENGINEERING CO.



INGERSOLL-RAND CO.

PANGBORN CORP.

ELECTRO REFRACTORIES & ABRASIVES CORP.



REICHHOLD CHEMICALS INC.

UNITED OIL MFG. CO.

PITTSBURGH CRUSHED STEEL CO. AND SUBSIDIARIES

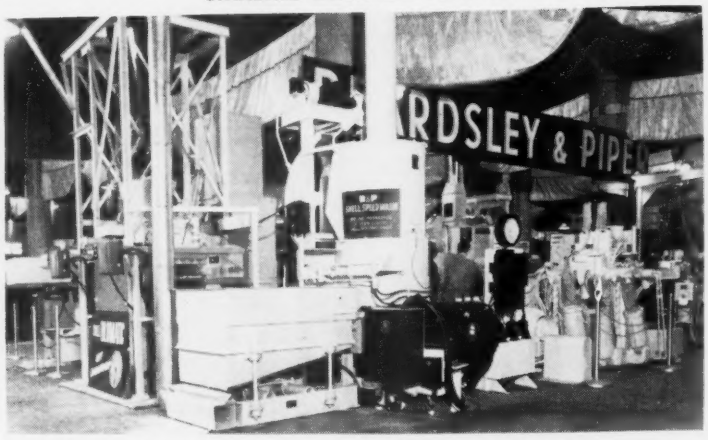
OSBORN MFG. CO.

FRANK G. HOUGH CO.

LINDBERG ENGINEERING CO.

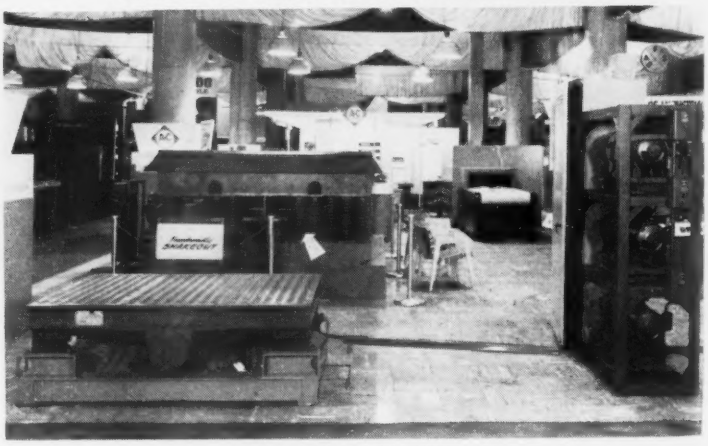
STANDARD ELECTRICAL TOOL CO.

BERYLLIUM CORP.



BEARDSLEY & PIPER DIV., PETTIBONE MULLIKEN CORP.

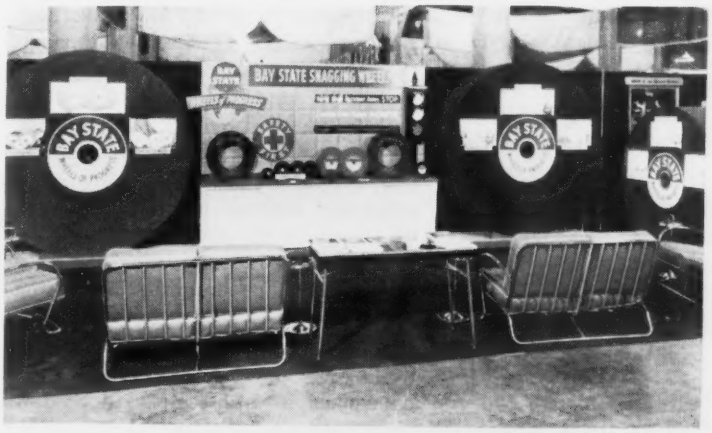
NICHOLS ENGINEERING & RESEARCH CORP.



ALLIS-CHALMERS MFG. CO.

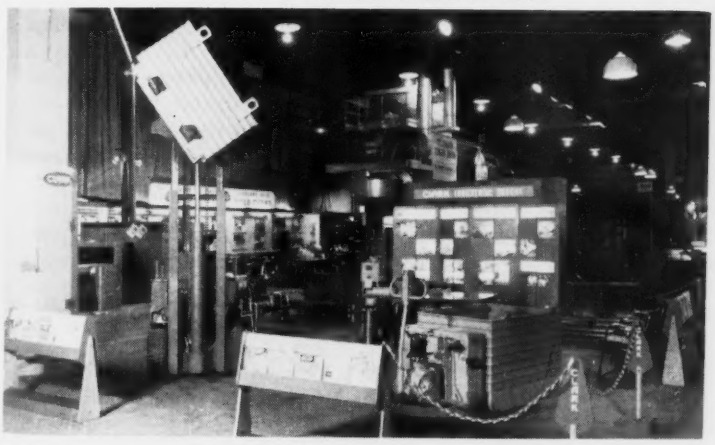
ELECTRO METALLURGICAL CO., DIV. OF UNION CARBIDE & CARBON CORP.

GRINDLE CORP.



BAY STATE ABRASIVE PRODUCTS CO.

PITTSBURGH LECTROMELT FURNACE CORP.



CLARK EQUIPMENT CO.

BORDEN CO., CHEMICAL DIVISION

FEDERATED METALS DIV., AMERICAN SMELTING & REFINING CO.

HERCULES POWDER CO.

FOUNDRY DEVELOPMENTS

By EDWIN BREMER

Metallurgical Editor

TESTING of sand specimens at elevated temperatures under conditions which more nearly approach those encountered in a mold, is being accomplished by a dielectric furnace developed at the British Cast Iron Research Association. Described in "Behavior of Sand Mixtures under Load at Room and Elevated Temperatures," by Godding and Rew, the furnace raises the temperature of standard 2 x 2-in. cylindrical sand specimens up to 1000° C in under 3 minutes, and thus does approach conditions in the mold at the moment of pouring. Details of the furnace as well as results of some sand tests are presented in the April issue of the *Journal of Research and Development* (Birmingham, England).

* * *

MOST recent addition to the several radioisotopes applicable to radiography is thulium. While its use as an x-ray source first was suggested by British scientists, the excellent rare earth separation facilities and powerful nuclear reactors in this country permitted development of a thulium source several hundred times more powerful. The thulium is made radioactive in the heavy-water nuclear reactor at Argonne National Laboratory, and provides rays comparable in energy to a 100,000-v x-ray machine. Equipment for handling the material is said to weigh less than 10 lb and to be relatively low in cost.

* * *

PAPER on "Decomposition of Cementite During Solidification of Cast Iron", by A. Berman and V. Kondic was presented at the recent meeting of the British Iron and Steel Institute. In it the authors state that the origin of graphite was investigated by comparing the time required for graphite to form on cooling with that required for cementite to decompose at the eutectic temperature. Latter time was found by extrapolating the experimental results for cementite decomposition below the eutectic temperature. Close similarity of the times compared in this way indicates that type D graphite can form by decomposition of the cementite.

* * *

NEW plastic fluoroscopic viewing screen developed by E. I. Du Pont De Nemours & Co., Wilmington, Del., to meet the needs of the Armed Forces now is available to the civilian market. Known as the Patterson Type CB-2, the screen is readily cleaned and is not affected adversely by humidity and fungus growth. It provides same brilliant image as the non-cleanable type it replaces, and has a longer life since its construction practically eliminates previous hazards of damage in handling installation and use. Average prices of the new type are said to be lower than the previous type.

* * *

STUDY of the possible cause of cracking in bathtubs by E. R. Evans, as reported in the February issue of the *Journal of Research and Development* (Birmingham, England), indicates that it was due to abnormally high contents of antimony, boron and lead in the iron. These elements entered the iron through charging of enameled scrap. Investigation suggested that enameled scrap be limited to 5 per cent of the charge. Calculations show that 9 per cent of enameled scrap consists of enamel; when 5 per cent of such scrap is used, about two-thirds of the available antimony and one-half of the boron are absorbed in the iron.

* * *

STUDY to determine a suitable medium for production of expendable molds for casting of titanium was conducted by Lang, Gissy, Schippereit and Kura, all of Battelle Memorial Institute. As reported in a paper presented at the recent meeting of the American Foundrymen's Society, best results were obtained with crushed graphite bonded with 12 per cent phenol resin. Graphite was screened to remove fines, and showed a distribution of 0.9 per cent on the 70-mesh, 45 per cent on the 100-mesh, 29.1 per cent on the 140-mesh, 19.6 on the 200-mesh, 5.1 per cent on the 270-mesh, and 0.3 per cent on the pan. Titanium castings from such molds had a good surface on sections up to 2 in. thick, and did not show pinholing.

* * *

NEW vacuum fusion gas analyzer recently installed in General Electric Co. Aircraft Gas Turbine Division is said to be able to determine 10 parts per million of oxygen, hydrogen and nitrogen in metals with an accuracy of plus or minus 10 per cent of the amount present. In the analyzer a solid metal sample is melted in a graphite crucible under a vacuum. Volume of the gases is measured and then they are circulated through three traps in series. First trap containing copper oxide at 325° C oxidizes carbon monoxide and hydrogen to CO_2 and water, respectively. Following trap removes the water in anhydrous magnesium perchlorate. The CO_2 is removed by freezing in liquid nitrogen. Pressure of the remaining nitrogen gas is measured, after which the carbon dioxide is allowed to vaporize and its pressure is measured. Hydrogen values are obtained by difference.

* * *

IN GERMANY experiments were made with a sand molding and core-making process using sodium silicate (water glass) as the binder and passing carbon dioxide gas through the mass. Mixture used contained 100 parts sand, 5 parts water glass and 1 part asphalt binder. Molds are hardened with the patterns in place, and cores while still in the corebox. Carbon dioxide is passed in at 30 to 60 psi through a steel tube thrust into the mold or core for seconds or minutes depending upon size.

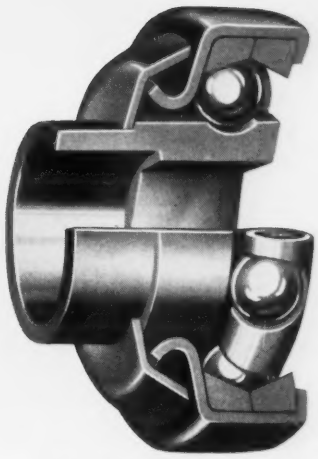
* * *

NAVAL Ordnance Laboratory has developed a high-temperature alloy using noncritical metals which shows promise as a substitute for certain stainless steels in many applications. Called "Thermenol," the alloy is a modification of a previously developed magnetic material, "16-Alfenol." New alloy is said to be 20 to 25 per cent lighter than stainless steel, and its physical characteristics include a high tensile strength coupled with a high resistance to corrosion or oxidation. Composition contains approximately 80 per cent Fe, 14 per cent Al and 4 to 5 per cent Mo or V.

* * *

CAREFUL investigation of electrical and magnetic properties of 24 cast irons of different compositions by M. H. Hillman and reported in the April, 1954 issue of the *Journal of Research and Development* (Birmingham, England) indicated that coarse graphite appears to lower remanent magnetism in both ferrite and pearlitic states. Graphite shape has little effect on coercive force or remanent magnetism in ferrite or pearlitic states. Nodular graphite appears to show slightly increased hysteresis loss in the pearlitic but in the ferritic the loss is reduced considerably. Increase in maximum permeability is favored by nodular and aggregate graphite. Highest magnetic induction and permeability are found in irons which have been annealed to the ferritic condition.

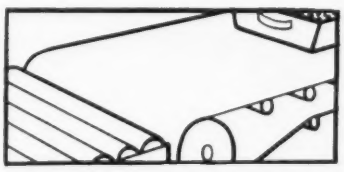
X-Series



X-Series Bearing Assembly
For new installations, and also interchangeable for replacement in existing Logan conveyors

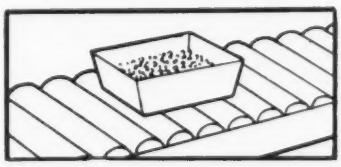
The NEW low-friction, extra quiet, high efficiency BEARING for CONVEYOR ROLLS. Semi-precision construction, yet low in price.

Developed by **Logan**



For Belt Conveyors

For Live Roll Conveyors



For Roller Conveyors

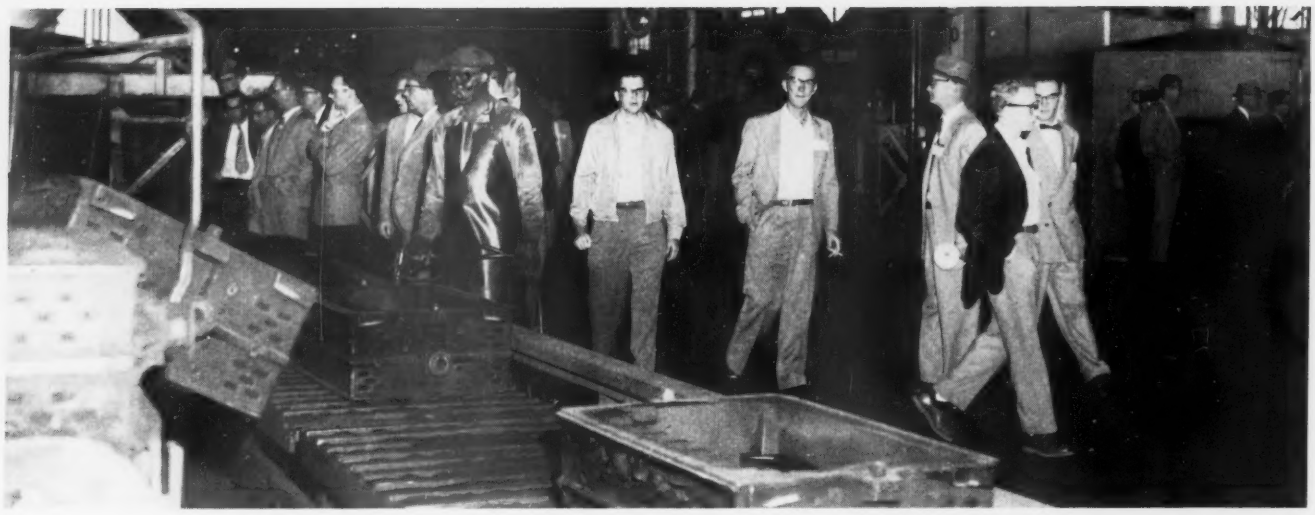
CONVENTIONAL TYPE BALL BEARING. Arrows in this illustration indicate the unavoidable friction when the balls are in contact with each other.

LOGAN X-SERIES BALL BEARING. Balls are caged in a steel container. Binding and friction caused by balls contacting each other is eliminated.

Logan leads again — with the most important bearing development for conveyor rolls in twenty years. Now available at about same price as regular conveyor bearings. Note: 33⅓% less grade required on gravity lines. Now furnished in Logan 50, 55 and 60 Bearing Sizes. Write for details.

Write for folder on X-Series, today

Logan Co. | **580 Cabel St. LOUISVILLE, KY.**



TECHNICAL REPORTS at the AFS Convention

Concluding reports on technical sessions at the AFS convention in Cleveland cover Gray Iron, Steel, Foundry Costs, Heat Transfer, Safety and Hygiene, Plant Equipment, Sand and the shop courses

ONE of the high points of the technical sessions at the 1954 AFS convention was the number and variety of practical shop courses included in the program. A total of 11 was offered, in 5 different fields, including refractories, brass and bronze, sand, gray iron and malleable iron.

Subject of the refractories shop course meeting was **The Importance of Refractories in Your Foundry.** R. A. Witschey, A. P. Green Fire Brick Co., Chicago; L. D. Christie Jr., Babcock & Wilcox Co., New York; Ralph Carlson, American Cast Iron Pipe Co., Birmingham; and A. H. Thompson, Canadian Refractories Ltd., discussed malleable and air furnace, ladle, cupola and steel melting refractories, respectively. With R. H. Stone, Vesuvius Crucible Co., Pittsburgh, these speakers also made up a panel to answer questions from the floor. Prior to their talks, F. H. Fanning, Harbison-Walker Refractories Co., Pittsburgh, presented and discussed a number of slides which showed different types of fire brick.

Mr. Witschey stated that a 3-in. series of fire brick is much preferable to 2½ in. because it saves labor, minimizes joint erosion and gives better service. He pointed out that the use of larger brick reaches a diminishing point at which tightness of joints decreases. The use of 3-in. brick is standard in Great Britain.

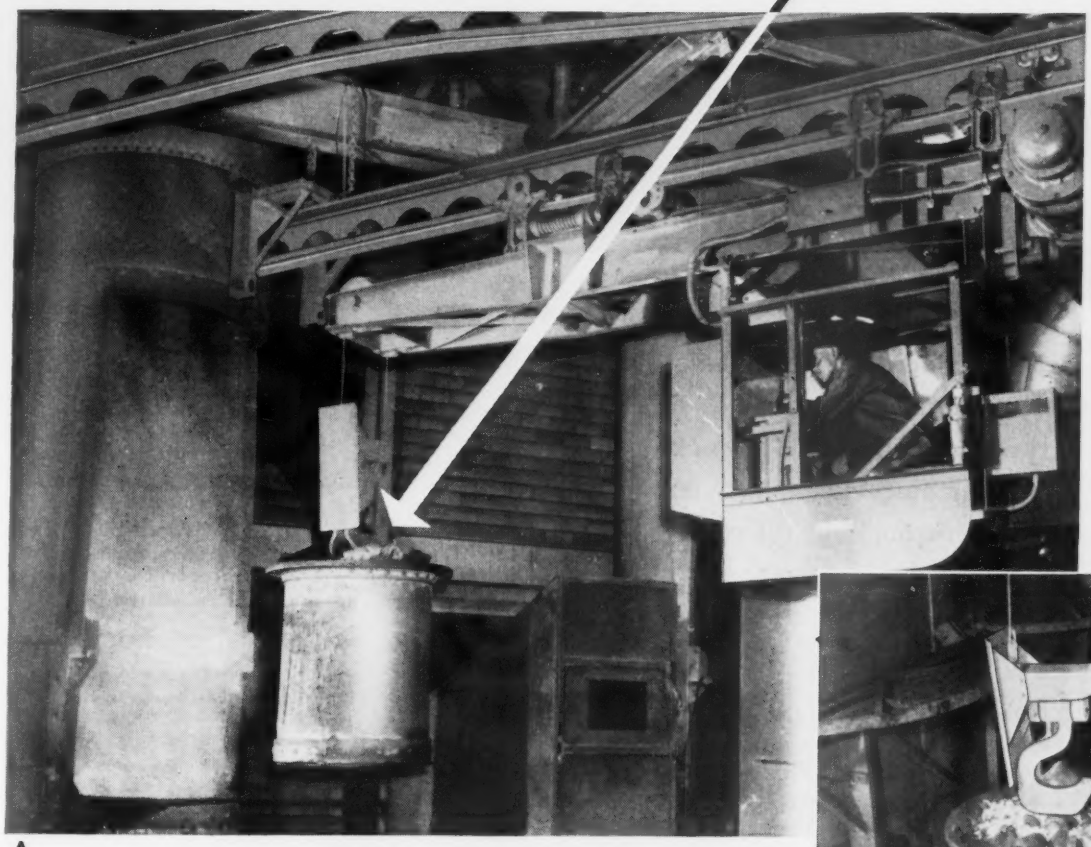
Mr. Christie enumerated a number of factors important to ladle life, including cutting effect of metal, ero-

(*Continued on page* 137)

Scenes on this page show some of the nearly 900 foundrymen who took advantage of the opportunity to visit the Ford Cleveland Foundry during the recent convention

A Radically Different **CUPOLA CHARGER**

2400 lbs. per charge 22 trips per hour



A

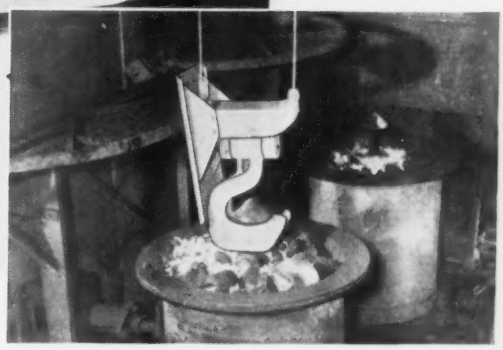
Every 3-minute period a 2400 lb. charge is delivered from the charging floor to any of 4 cupolas with this Tramrail charger.

B

Buckets on floor far below Tramrail System can be hooked or unhooked by means of the special hook by the cab operator alone.

C

One charging carrier operating on this Tramrail track and switch system serves the 4 cupolas which are operated in pairs on alternate days.

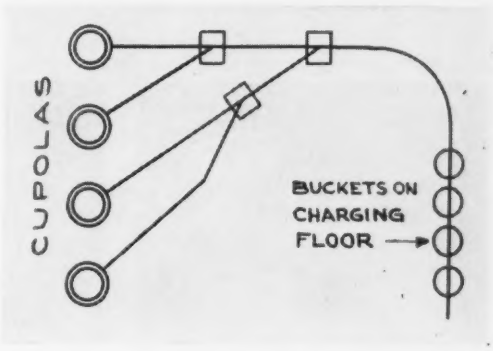


B

Here is a tried and proven Cleveland Tramrail cupola charger that is different from others in that the cab operator alone can hook and unhook charge buckets by means of a special hook without leaving the cab and without assistance of floor men.

A bucket is hoisted from the charging floor, far below, and delivered to anyone of four cupolas. When lowered into a cupola, the materials drop out as the cone-shaped bottom separates from the bucket shell. The Tramrail operator then returns the empty bucket to the charge floor.

This highly efficient cupola charger has been in successful operation in a prominent mid-western foundry since 1940. Iron is melted continuously 20 hours per day.



GET THIS BOOK!

BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
3837 EAST 286th ST. WICKLIFFE, OHIO

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

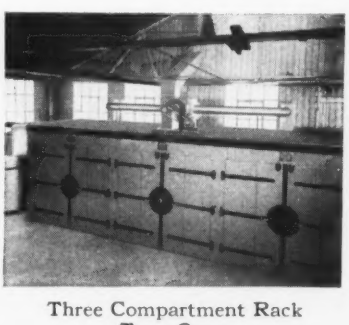
A LOT MORE THAN FANS DUCTS, HEATERS AND PANELS GO INTO . . .

LANLY FOUNDRY OVENS

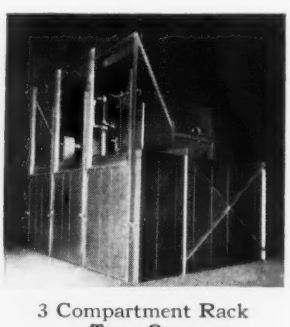
The proper adaptation and utilization of the essential component parts in every LANLY OVEN for maximum operating efficiency and economy, is a certainty being proved every day in foundries throughout the country. Specialized knowledge evolved from long experience and close cooperation with our customers enables us to design and erect better foundry ovens.

Upon receipt of information covering your needs, we will submit a proposal for an oven that will be thoroughly guaranteed as to construction and performance.

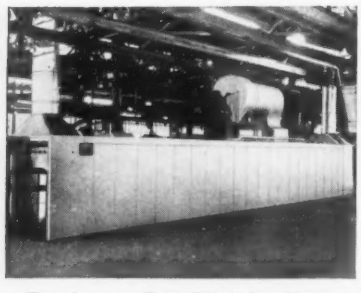
LANLY CAR TYPE OVEN featuring fast, uniform drying with low fuel consumption. Complete automatic operation. Sturdy construction yet pleasing in appearance. Comparative low initial cost.



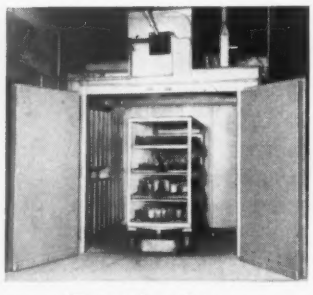
Three Compartment Rack Type Oven



3 Compartment Rack Type Oven



Continuous Core Blacking Oven



De-waxing Oven

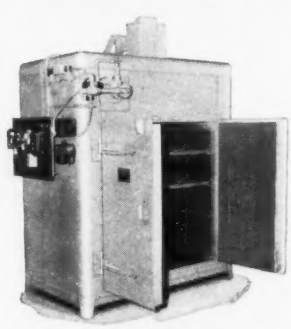
Combination Rack and Drawer Type Oven

Plaster Mold Drying Oven

LANLY FOUNDRY OVENS

THE LANLY COMPANY • 780 PROSPECT AVE
CLEVELAND, OHIO

WRITE FOR THE LATEST CATALOG AND FACTS ON ANY INSTALLATION



Shelf Type Core Oven

(*Continued from page* 134)

sive action of slag and spalling or heat shock resistance of the refractory. Usual ladle brick is siliceous, not as refractory as alumina refractory. Joints of this brick tighten up as they expand, glazing and forming an almost jointless lining which resists metal penetration. During the discussion he agreed that when a ladle is in continuous use, alumina brick probably would give better service. He added that about 10 per cent graphite content in the refractory gives excellent results, but that graphite cannot be mixed easily with a basic refractory, consequently it is not a common practice.

In his talk, Mr. Carlson recommended the use of the *Cupola Handbook*, on which he was one of the workers. He advised common sense in the operation of a cupola, particularly noting the need for supervision of cupola patching and for quality work in refractory installation.

Mr. Thompson discussed refractory practice in Canadian electric furnaces. There was much interest in his description of water cooling of the delta section in electric furnaces, a step which in some special instances has yielded a 50 to 60 per cent increase in the life of high-duty brick.

HEAT TRANSFER

THREE papers were presented at the first of two sessions sponsored by the Heat Transfer Committee. Victor Paschkis, Columbia University, New York, opened the session with the AFS-Columbia heat transfer research progress report, **Solidification of Finite Cylinders,** an extension of the 1953 progress report, wherein it was shown that in a long cylinder solidifying in sand, surface temperature increases beyond the Riemann temperature value, which is a computed value prevailing at the interface casting-sand mold under certain limiting conditions. The current paper includes the case of an increase in Riemann temperature, in addition to showing conditions as discussed in the previous report.

With interface at Riemann temperature for 20 seconds after pouring followed by an increase to 1.032 x Riemann temperature, solidification time for an infinitely long cylinder was 220 seconds, the same length of time as was determined for a very long cylinder under due consideration of the sand mold. An equation was derived for the solidification time of a finite cylinder which gives good to excellent correlations for small lengths and for values above 2, with considerable deviation between those points.

Results of this research suggest an investigation to verify a portion of the work and a further attempt to verify the validity of the assumed surface condition.

Second paper, **Heat Transfer Characteristics of Shell Molds,** by R. E. Morey, H. F. Bishop and W. S. Pellini, Naval Research Laboratory, Washington, represented an attempt to answer questions about risering, feeding and removal of heat in shell molds in the same fashion they have been answered about sand molds. Mr. Morey delivered the paper.

Work was limited to plates five times as wide as they were thick, with risers three times as wide as thick. Shells were made with an AFS No. 150 washed sand containing 7 per cent resin, clamped together with staples and placed in metal containers. Backing was either 1/16-in.-diam steel shot or coarse sand of AFS fineness 5.2, both compacted with a small air vibrator on the container.

Results showed that metal thickness of the plates has a greater effect on the time required to reach solidus than does shell thickness. When shell thickness and backup were varied, an appreciable decrease in solidification time was obtained only with thin shells backed with shot, effects becoming more pronounced as shell thickness was reduced. Effect of gravel backup is very small even with thin shells. Shells used without backup showed a marked increase in solidification time.

When casting thickness was varied, effect of shot backup became more pronounced as thickness of the casting was increased. Important variable is the ratio of shell thickness to plate thickness. It was concluded that the effect of pouring in shell molds is similar to that of pouring in sand molds, data for which are applicable for all metals.

Concluding paper was **Solidification of Various Metals in Sand and Chill Molds,** by F. A. Brandt, H. F. Bishop and W. S. Pellini, Naval Research Laboratory, Washington D. C. Mr. Brandt presented the paper, which describes part of a long-range program aimed at establishing solidification characteristics of metals and their relationships to foundry problems.

Solidification curves were employed to show that the process of wall growth always is less progressive in sand molds than in chill molds. Metals which show narrow band features in chill molds generally retain these features in sand, and metals which show wide band freezing in chills change to exaggerated wide band freezing in sand. Metals which have low to moderate conductivity and a wide solidification range are most sensitive to changes from chill to sand. For such metals, the use of chills in foundry practice provides not only control over local solidification rates, but also over the nature of wall growth. Compared with gray iron or steel chills, graphite has markedly higher conductivity, but lower specific heat.

Solidification times are determined basically by the amount of heat which must be removed from the metal and the rate at which the mold material can remove this heat. Chill molds, which remove heat at faster rates than sand molds, naturally result in faster solidification. In sand molds, conductivity of the solidifying metal has little effect on solidification time because of heat flow from the casting. In chill molds, conductivity is important because the rate at which heat may be moved from the center to the surface of the casting influences the rate of heat absorption by the chill.

A peculiar case arises for metals such as aluminum, which have higher conductivity than the steel chill. In such cases, the chill removes heat no faster than the casting can transfer heat to the interface, as indicated by the very high interface temperatures which are developed. In the case of metals of low conductivity, the interface temperatures of the chill are maintained at relatively low levels.

Chilling action in solidification of metal provided the discussion topic at the second heat transfer session, at which two papers were presented. The first, **Heat Transfer of Various Molding Materials for Steel Castings,** by Charles Locke, works manager, West Michigan Steel Castings Co., Muskegon, Mich., and Charles W. Briggs, technical and research director, Steel Founders' Society of America, Cleveland, was presented by Mr. Locke.

The report covered studies carried on at Armour Research Foundation for the Steel Founders' Society and was intended to evaluate the heat

extracting ability of a number of materials that appeared suitable as molding materials for steel castings. The time for solidification of 6-in. steel spheres poured in molds of 25 different materials was used as a measure of the chilling ability of that particular mold. Solidification time, corrected to a standard pouring temperature of 2870° F, ranged from 4.2 minutes for a 3-in.-thick copper chill to 31 minutes for a thermit-silica compound 1½-in. thick.

Magnesite was found to be the most potent and cheapest moldable chill. Chrome ore also is a reasonably priced effective chill. Zircon was the most easily handled moldable chill. A 40 per cent diatomaceous earth, 60 per cent sand mix with phenolic resin binder was a very effective insulator, while the thermit-silica mixture was the most potent retarder of solidification.

In practical application of the data it was pointed out that materials with insulating qualities better than those of sand could be used at positions of thin sections where there is a desire to feed through the section or to throw centerline shrinkage to one side of a section. Also, such materials could be used as sleeves for risers to retard solidification.

Studies of Chill Action, the concluding paper, was prepared by E. T. Myskowski, H. F. Bishop and W. S. Pellini and given by Mr. Myskowski. It represented a study of the effects of chill thickness and of the use of a sand spacing to remove the chill from direct contact with the casting.

While practically instantaneous freezing occurs under the direct contact chill, a ⅛-in. sand spacing delays development of a solid skin for about 2 minutes and a 1-in. sand spacing delays it approximately 5 minutes. With many metals the use of chills may create hot tears in regions adjoining the chill edge. However, the use of a spacing layer eliminates this sharp change in mold-wall heat transfer characteristics and provides the smooth decrease in solidification rates required to prevent chill-edge hot tears. At the same time, it should be noted whether this practice renders the chill ineffective in controlling directional solidification or eliminating hot spots, although in controlling hot spots, moderate rather than maximum chill effects usually are desired.

BRASS SHOP COURSE

PRACTICAL aspects of the production of cores were discussed in two brass and bronze shop courses. At the first session, which was concerned with equipment, a paper, **Coreboxes and Driers,** by Robert W. Wendt, Industrial Pattern Works, Chicago, offered practical suggestions on construction details.

Mr. Wendt dealt principally with design problems and stated that it is simpler to cast metal coreboxes to closer tolerances, taking shrinkage allowances into consideration, if the metal thickness of the box is held to ⅜-in. to ⅝-in. Properly placed ribbing in the base provides strength and rigidity. Additionally, alloy selection is important to maintain accuracy of intricately shaped boxes.

With respect to core driers, the speaker advocated adequate resting pads since they provide quick indication of loss of alignment and they also make realignment of the drier easier. Number of perforations in the drier depends on the sand and type of core oven used, but they speed drying of the core. Large flat areas should have metal removed. These areas, referred to as windows, cut down drier weight and help in casting the drier. In conclusion, Mr. Wendt urged that coreboxes and driers be handled with care so that the close tolerances to which they are manufactured may be maintained.

In subsequent discussion, Mr. Wendt stated that nylon now is available in many different forms and has been inserted at points of wear in coreboxes with success. He also pointed out that sand which makes a right angle turn between the reservoir and its entrance into the corebox results in less damage to the corebox.

Mr. Wendt advocated annealing core driers to stabilize their dimensions and eliminate growth of the metal while in service. A three to four-hour anneal at 650° F is adequate.

Core Ovens were next described by Charles H. Barnett, Foundry Equipment Co., Cleveland. Using slides, Mr. Barnett showed charts indicating tensile strengths of cores baked at varying temperatures from 400° to 650° F. The tests indicated that cores baked at 400° F reach maximum tensile strength almost as quickly as at the higher temperatures but there is not the abrupt loss of strength as is the case with fast-baked cores.

Mr. Barnett then described factors taken into consideration in the design of single and multiple compartment vertical ovens and tower ovens so that the air is changed rapidly yet with fuel economy, consistent temperatures obtained throughout the oven and maintenance of comfortable work area in the vicinity of the oven. He concluded with a discussion of the advantages and disadvantages of dielectric ovens.

Program of the second session included two papers on the subject of "Developments in Coremaking." First of these, **Practical Know-How of Core Blowing and Machine Maintenance,** was presented by George E. Miller, Federal Foundry Supply Co., Cleveland.

Mr. Miller pointed out that most core blowers have interlocking controls which bring the machine to a halt at any time that the operating cycle is interrupted. Discussing features of various models, he explained that parting lines can be either vertical or horizontal. Some machines have agitators which stir sand in the reservoir, breaking up sand around channels to blowholes and preventing buildup of hard channels. Corebox ejectors are used, and high production shops commonly need corebox locators.

He stressed that mechanics must understand the operation of machines before they attempt to repair them. In particular, mechanics must be able to locate sticky points. Stickiness prevents good seals and can cause sand to spray from the machine. Core sand should not be allowed to stick and to cake up and air dry overnight. The machine should be cleaned at the end of each day, and the core vents should be kept clear.

Questioned during the discussion period as to the proper ratio of blowhole size to vent size, Mr. Miller stated that he knew no formula, but offered a rule of thumb: Try to position vents so as to lead sand to points where hardness is desired, with about a 5 or 6 to 1 vent area to blowhole ratio. Vents should not be entirely in the drag side, or they will plug up.

Warner B. Bishop, Archer-Daniels-Midland Co., Cleveland, delivered the concluding paper, **Oil-Bonded and Resin-Bonded Cores.** Pointing out that cores are the cheapest way to produce cavities in castings, Mr. Bishop stated that the ideal binder does not exist, and he enumerated the following qualities that it would have to possess: Stability in storage; good dispersion; long bench life; compatibility with other binders; flowability in mix; fast curing; a flat curve in curing; dimensional stability

(*Continued on page* 140)

Report

FROM *Famous* CORNELL CUPOLA FLUX USER

Says

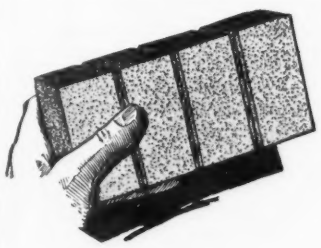
PROFIT BY THE EXPERIENCE OF OTHERS--

Get better iron, Get better castings, more efficient cupola operation and lower maintenance cost.

Famous Cornell Cupola Flux has a record of more than 35 years' success in improving casting production and cupola operation.

This has been achieved by —

- Purging molten iron of impurities.
- Increasing the fluidity of iron.
- Greatly reducing sulphur.
- Improving the fluidity of slag.
- Keeping cupola drops cleaner, practically eliminating bridging over and reduces chipping time and labor.
- Prolonging life of cupola lining. A glazed or vitrified protective surface is formed on brick or stone, reducing erosion and patching.



SCORED BRICK FORM

Approx. 4-lb. Brick

This Pre-Measured Scored Brick Cupola Flux costs but little and takes but a few seconds to use with each cupola charge of iron.

WRITE FOR BULLETIN NO. 46-B

McNally Pittsburg Foundries, Inc.

FOUNDERS OF PROCESS & ALLOY CAST IRON

Pittsburg, Kansas

March 28, 1950

Mr. Edward W. Crudup
The Cleveland Flux Company
1026 Main Avenue, N.W.
Cleveland 13, Ohio

Dear Mr. Crudup:

In reference to our recent conversation, I am glad to give you a report on the use of Famous Cornell Iron Cupola Flux in our melting operations and data on the life of our melting zone.

We have used your material since October, 1946 obtaining excellent results. We found our iron to be cleaner with a denser grain structure. The iron was more fluid and seemingly had more life. Slagging troubles were practically eliminated with the improved fluidity of the slag. We noted that our drops were cleaner with only a nominal amount of work required to prepare the cupola for succeeding heat, less chipping and patching required.

Through the use of Famous Cornell Iron Cupola Flux, our special tuyeres, baffles in the windbox and other means, we have used our present melting zone since January 25, 1940, now in its 60th week. The cupola inspection today showed the melting zone to be in good condition.

In closing, I am glad to say that we are well pleased with the contribution your material has made to our cupola operation and will continue its use as long as results such as these are secured.

Cordially,
Walter Moon
Walter Moon, Metallurgist
Harley T. Hendricks, Supt.

mc

The Cleveland Flux Co.

1026-1040 MAIN AVENUE, N. W., CLEVELAND 13, OHIO

Manufacturers of Iron, Semi-Steel, Malleable, Brass, Bronze, Aluminum and Ladle Fluxes - Since 1918

FAMOUS CORNELL FLUXES

Trade Mark Registered

BRASS FLUX

FAMOUS CORNELL BRASS FLUX cleanses molten brass even when the dirtiest brass turnings or sweepings are used. You pour clean, strong castings which withstand high pressure tests and take a beautiful finish. The use of this flux saves considerable tin and other metals, and keeps crucible and furnace linings cleaner, adds to lining life and reduces maintenance.

ALUMINUM FLUX

FAMOUS CORNELL ALUMINUM FLUX cleanses molten aluminum so that you pour clean, tough castings. No spongy or porous spots even when more scrap is used. Thinner yet stronger sections can be poured. Castings take a higher polish. Exclusive formula reduces obnoxious gases, improves working conditions. Dross contains no metal after this flux is used.

(*Continued from page* 138)
in green strength; moisture resistance; low gas evolution; freedom from odors and toxicity; economy; and availability. Since some of these ideals conflict, there is no ideal binder.

Mr. Bishop noted that economies in coremaking depend on how material is used, rather than on which material is used. In particular, cereals and resins should be weighed, not measured volumetrically. Volume measurement lends itself too much to human error. Oils also are better weighed than metered.

Per cent of moisture is of utmost importance, for a 2 per cent variation can change baked strength by 50 per cent, and a 1 per cent variation can change green strength by 100 per cent. Roughly, low moisture—2 to 1 cereal—gives the best green strength. Excess moisture slows the bake and hinders blowing.

Also vitally important is mixing sequence. Either water or cereals can be added first, but core oil should always be preceded by both. This point is not quite so vital with resins as with oil if a liquid resin is used, because resins are not water repellent.

In closing, Mr. Bishop stressed that foundrymen must know the characteristics of their binders and take advantage of them.

SAFETY and HYGIENE

THE Safety, Hygiene & Air Pollution Control program consisted of three sessions devoted to dust control and ventilation, safety, and air pollution control, respectively. Subject of the first session was **Helpful Hints on Foundry Dust and Ventilation Control.** To open the session J. R. Allan, International Harvester Co., Chicago, gave the annual progress report on the program of the Safety, Hygiene and Air Pollution Control Committee of the AFS.

Reporting on the activities of the group's subcommittees, Mr. Allan stated that the dust control and ventilation committee is propounding the *New Recommended Good Practices Manual* to be published in the near future, and the air pollution and control committee is preparing a pamphlet for early distribution. The noise committee is working on clarification of material on this subject, and the welding committee is collaborating with the Illinois Safety Committee in bringing about safer working conditions. His report also touched on what local AFS chapters have been doing to stimulate local educational activities and encourage research in handling of magnesium and aluminum castings to overcome serious accidents.

B. B. Bloomfield, Division of Occupational Health, Michigan Department of Health, Lansing, Mich., conducted a demonstration with small models of various types of exhaust hoods used for ventilation in foundries.

Subsequent speakers outlined material to be included in various sections of the manual mentioned above. Albert Edwards, American Brake Shoe Co., Chicago, presented material on **Foundry Hygiene Problems** as it had been prepared by H. J. Weber, same company. Discussion of siderosis, silicosis, lead and beryllium poisoning, dermatitis, and other industrial health hazards included suggestions concerning preventive measures to avoid them, as annual chest x-rays, and consultation with authorities concerning local codes.

Principles of Exhaust Ventilation were developed by W. W. Dodge, Caterpillar Tractor Co., Peoria, Ill., who demonstrated with slides, types of exhaust hoods and conveyor bench side hoods used over tumbling mills, pouring zones, and chipping and grinding benches. Adaptation of dust filters, overhead hoods, rotary blast and air blast protective hoods was demonstrated.

F. C. Fluegge, International Harvester Co., Chicago, in his discussion of **Ventilation of Sand Handling Equipment,** suggested that the forthcoming manual should be used only as a guide. Types of ventilators and dust arrestors should be determined by specific conditions and in sparsely populated foundry areas inefficient equipment may not result in the hazards which develop in crowded neighborhoods. Slides illustrated typical fume table and exhaust systems, and installations of mold cooling and grinding section protective hoods.

Cooling of Castings was discussed by T. J. Glaza, Crane Co., Chicago, who emphasized importance of equipment adequate to handle hot castings. Self dumping basket conveyors and other types were illustrated, including conveyors for transporting steel castings of various sizes and shapes. Slides also demonstrated cooling curves showing how fast castings would cool, and suggestions were made for measuring temperature of castings in basket conveyors.

K. M. Smith, Caterpillar Tractor Co., Peoria, Ill., in outlining **Principles of Effective Maintenance of Foundry Ventilation and Dust Collecting Equipment,** suggested use of data books to record pertinent information for maintenance of parts, checking of equipment, etc. He discussed vibration problems induced by fans, wet and dry dust collectors, stressing importance of keeping such equipment in good working condition, and illustrated his talk with slides showing typical installations. A well operated maintenance program will pay for itself, he said.

The problems of safety, good housekeeping, accident prevention training, and use of protective equipment were discussed at the second session before about 40 persons. **Value of the Safety Program to the Foundry** was the subject of a paper by E. C. Hoenicke, Foundry Division, Eaton Mfg. Co., Vassar, Mich. Mr. Hoenicke pointed out that one accident affects the entire foundry industry in that each accident when added to the total creates an industrial insurance rate for the entire industry. Each accident increases cost of production in an already highly competitive industry and lost hours mean reduced income and reduced buying power for the worker injured. Safety education is a management responsibility that requires continual study and enforcement.

Harold Zuehlke, Allis-Chalmers Mfg. Co., Milwaukee, presented a paper entitled **The Camera Aids Our Housekeeping and Inspection Program.** Allis-Chalmers has instituted a program of "before and after" photographs that are displayed within departments to indicate poor housekeeping and safety practices. This focuses attention on poor techniques at the worker level and has built up rivalry between departments and between individual foremen who strive not to have such photographs taken or displayed in their departments. The program is too young at this time to evaluate whether the accident rate has been reduced.

Training in Accident Prevention was the subject of T. A. Kraklow, Deere and Co., Moline, Ill. The supervisor is the all-important person in the accident prevention program, according to Mr. Kraklow. Accident rates generally reflect the foreman's supervisory ability. As the foreman is paid a premium wage because of his know-how and ability to handle men, he should assume the responsibility of training his fellow workers in safe working practices. He should

(*Continued on page* 143)

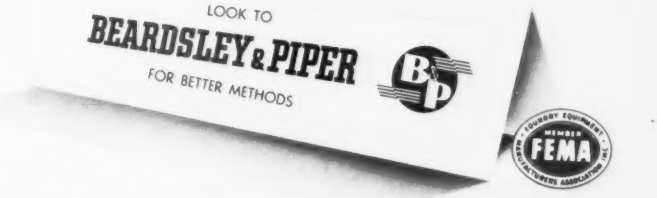
Why does the SPEEDMULLOR Use Less Power?

A 125 horsepower motor (in the 80A Speedmullor) operated for one minute, consumes far fewer *K.W.H.* than a 75 horsepower motor operated for three or more minutes. Because the Speedmullor thoroughly mulls molding and core sands to *maximum physical properties in less than one-third the time* required in a conventional mixer, it uses fewer K.W.H. of electrical power per ton of sand. Electric bills are based on K.W.H. . . . you pay for K.W.H. and not horsepower. Your costs are determined by K.W.H. per ton of sand mulled.

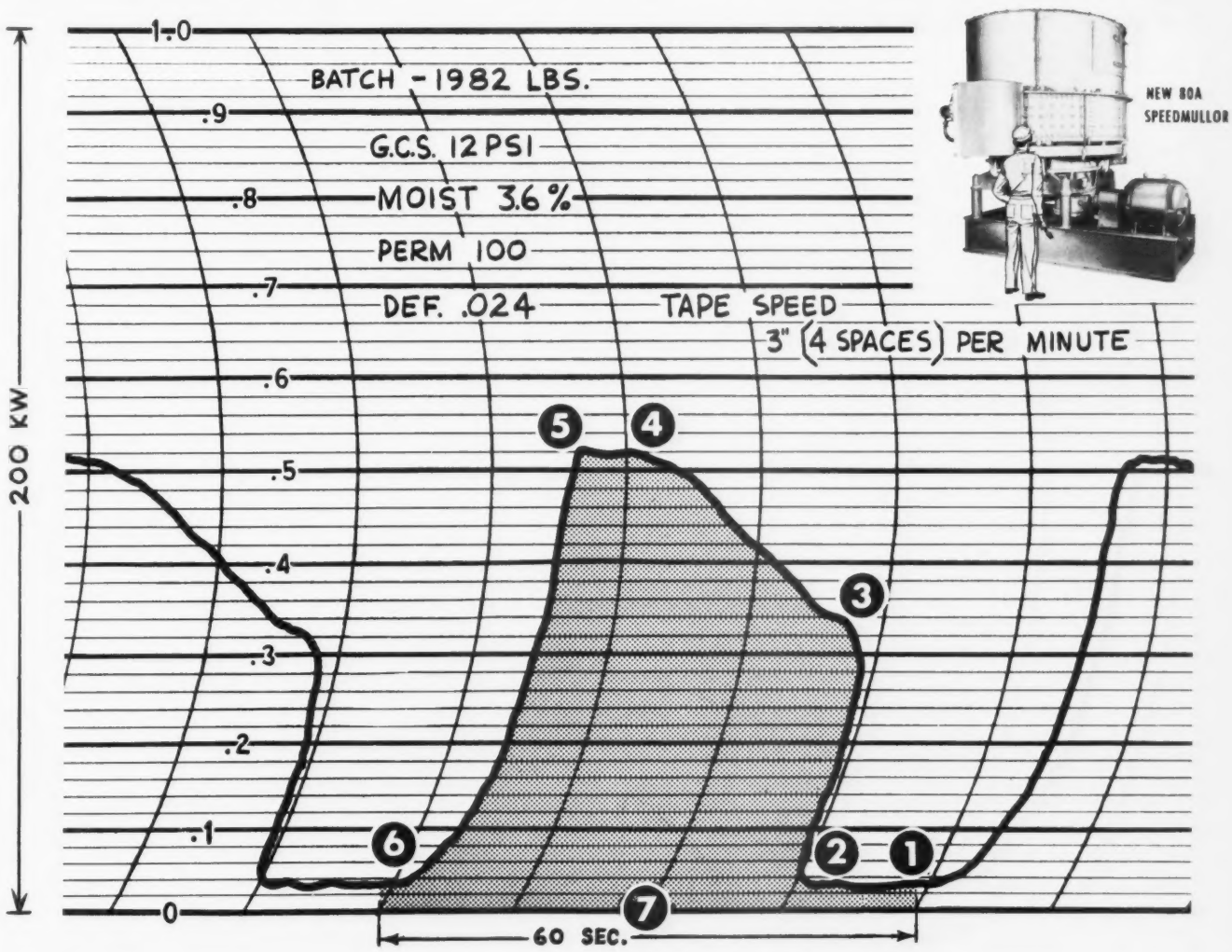
Modern high speed mulling pays off in capacity too. The 80A Speedmullor *fully mulls* more sand per hour than any other mill.

write today for complete information

BEARDSLEY & PIPER DIVISION OF
PETTIBONE MULLIKEN CORPORATION
2424 North Cicero Avenue • Chicago 39, Illinois

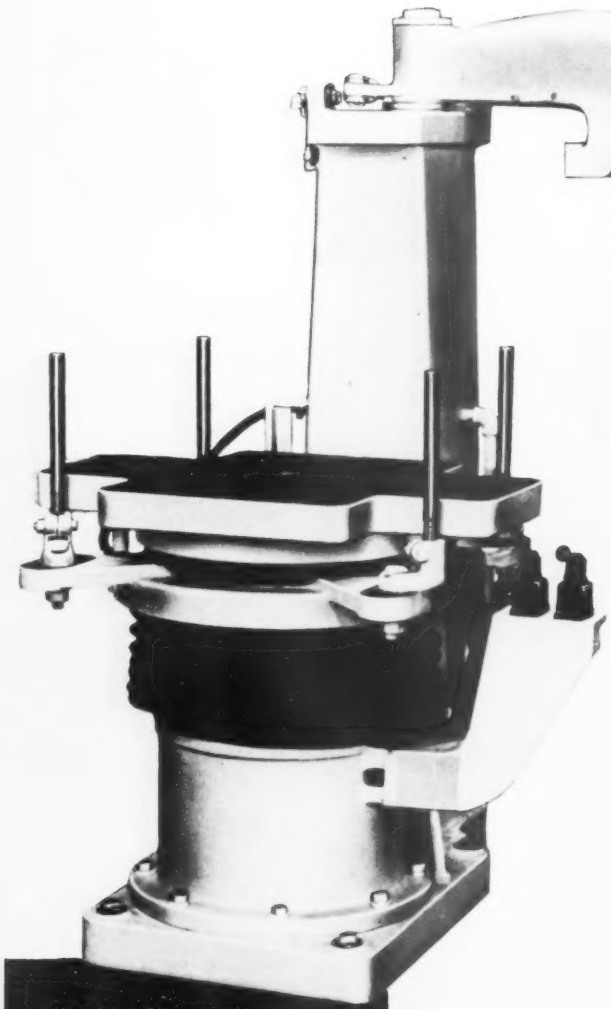


AN ACTUAL POWER GRAPH RECORD OF A 1982 LB. BATCH OF MOLDING SAND MULLED IN AN 80A SPEEDMULLOR.

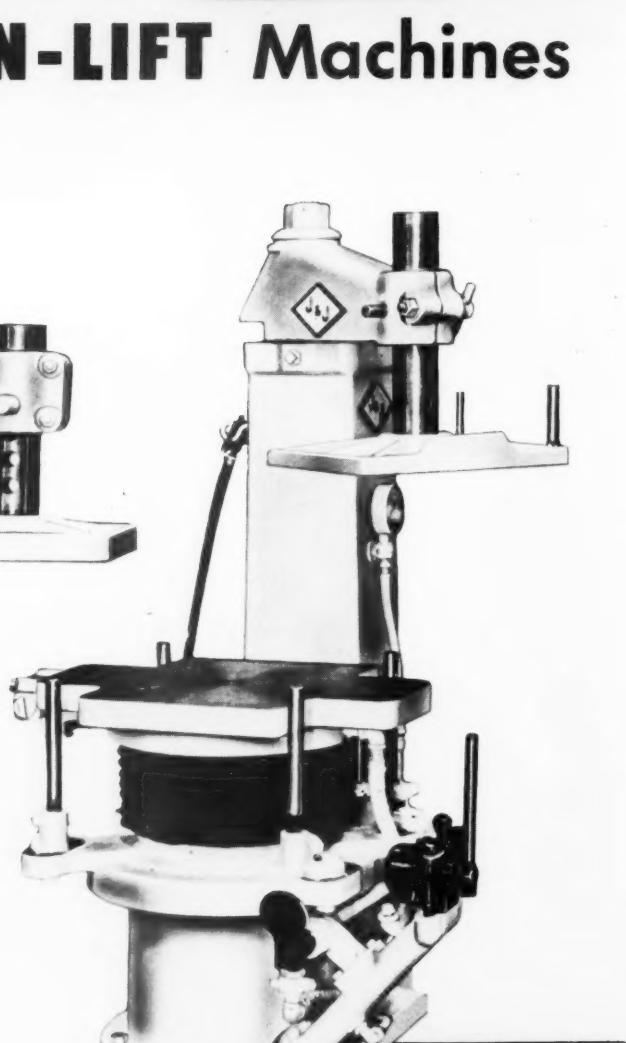


1. Flush water is introduced.
2. Batch of sand and bonding additions charged.
3. "Temper water is added and strength starts developing.
4. The maximum physical properties are attained after 45 seconds . . . green compressive strength—12 p.s.i.
5. Batch is discharged after 51 seconds.
6. Discharge complete in 9 seconds (1/3 to 1/2 the time required by conventional muller).
7. Total elapsed cycle time—60 seconds . . . average horsepower for cycle—81.66 . . . total power consumed—1.02 K.W.H. to fully mull 1982 lb. batch.

The Only Completely NEW
JOLT SQUEEZE PIN-LIFT Machines



716-8
7" jolt cylinder
16" squeeze cylinder
8" pattern draw
24" x 34" table



513-6
5" jolt cylinder
13" squeeze cylinder
6" pattern draw
19" x 26" table

Brand new in design and featuring an exclusive concentric draw cylinder guided by a full-circle bearing area around the large squeeze cylinder, the J&J 513-6 and 716-8 offer the most accurate draw obtainable with this type of machine.

Internal guides are hardened and ground to assure retained accuracy of draw. The jolt of the 513-6 is knee-valve-controlled, while a single hand-valve controls both squeeze and draw. Two convenient pilot valves control all operations on the 716-8. Both machines feature positive, controlled slow and fast draw on the same stroke, with automatic vibrator control.

LOOK TO BEARDSLEY & PIPER FOR BETTER METHODS

FEMA

write today for complete information

BEARDSLEY & PIPER
DIVISION OF **PETTIBONE MULLIKEN CORPORATION**
2424 North Cicero Avenue • Chicago 39, Illinois

(*Continued from page* 140)

maintain interest in safety among his workers by discussing safety problems with them singly and in groups. He should keep his department free from accident hazards by his own example. If all workers did their jobs as they should be done, the problem of accident prevention would be solved. To accomplish this, the supervisor must continually hammer away at the problem until good safety practices become commonplace—and then he must never cease hammering because safety problems in industry are always present.

R. L. Berger, Belle City Malleable Iron Co., Racine, Wis., presented data in a paper, **Protective Equipment,** to prove that a company's interest in such equipment for employees will pay off in better work performance, reduced number of accidents, and increased production efficiency.

Colored slides with commentary by Gordon White, Central Foundry Division, General Motors Corp., Detroit, was an interesting presentation of what little things can be done in a large operation to prove that **Safety Is Good Business.** The slides gave examples of how a continuing, organized effort through slogans in work areas, safety devices on equipment, and good housekeeping practices provides clean work surroundings to reduce many causes of accidents, increases employee morale by providing an attractive place to work, reduces lost-time compensation costs, and results in better production from which both management and labor benefit.

Controlling cupola fly ash was discussed in three papers at the concluding session. Experiences with the **Use of a Spray Type Collector on a 72-in. Cupola** were reviewed by A. G. Tompkins, Lufkin Foundry & Machine Co., Lufkin, Tex.

Mr. Tompkins described the collector designed by the Lufkin foundry. The collector uses 160 gallons of water per minute at 63 psi pressure and collects 16 lb of solids per ton of gray iron poured. The water is recirculated after passing through a settling tank. The unit was not installed to meet local air pollution ordinances but rather as a good neighbor policy and complaints from residents of the neighborhood have decreased considerably. Estimated maintenance cost of the unit is $400 per year and the necessity of cleaning the foundry roof several times a week has been eliminated.

R. M. Ovestrud, Minneapolis-Moline Co., Minneapolis, then discussed the experience of that organization with equipment for **Cupola Fly-Ash Suppression.** The equipment consists of one collector head for each of two cupolas, a 3000-gal recirculative dewatering tank and two 20 hp 250 gpm sludge pumps. One problem that had to be met about six months after installation was excessive wear on one pump caused by a highly acid condition in the water system. To overcome this, approximately 8 lb of trisodium phosphate is added to the dewatering tank each hour and checks are made regularly to see that a pH indication of 6.5 to 7.0 is maintained. After two years of service the pumps have shown no appreciable wear.

Mr. Ovestrud stated the most striking benefit derived from the installation has been the reduction in deterioration of the foundry building roof. Formerly roof cleanup required one man working 40 hours a week, 50 weeks a year. At present 80 manhours twice a year is devoted to the job, thereby reducing wear and tear on the roof from shoveling, picking and scraping. It has been estimated that during a 16-hr period when 200 tons of metal were melted, 5 tons of material were collected from cupola stack gases.

A review of equipment development for **Cupola Emission Control** at the Chevrolet-Saginaw Gray Iron Foundry, General Motors Corp., Saginaw, Mich., was presented by Otto J. Brechtelsbauer. Major change in the unit as originally installed at the Buick foundry in 1945 has been to replace the original 70 spray nozzles which were spaced evenly around the base of the cone with a single nozzle which is located over the apex of the cone. Because the distribution of the water is uniform, the unit is effective.

Operation of the equipment is practically foolproof when the following rules are observed: Collector water and cupola blast must be turned on simultaneously; no papers, cartons or rags are to be thrown into the cupola for disposal. Water volumes are 470 to 500 gpm divided equally between the two or three cupolas in operation. Normal maintenance requirements are general inspection and cleaning of the units which average less than four manhours per week. Total cost of the installation in 1947 not including water supply, drain and overflow piping was $20,400 for six cupolas. Maintenance is approximately $8500 annually for the six units and the cone and upper shell life is approximately six years.

Concluding paper was **Control of Emisisons for the Electric Furnace** by L. Krueger, Pelton Steel Casting Co., Milwaukee. The system in use at Pelton comprises a hood arrangement on the electric furnace. It was installed about nine years ago and is presently showing signs of wear. Before the air is discharged to the outside, it passes through a precleaner chamber in which spray nozzles direct water into the rotating air. From there the air is drawn through a fan and discharged.

In 1950 the Pelton company began using oxygen in its melting practice and this increased contamination considerably during the period of oxygen injection. To meet local smoke control laws, batteries of high-pressure spray nozzles were added to the precleaner chamber which resulted in water being carried into the outside atmosphere. It was contaminated with dust particles and iron oxide and the residue it left as it settled over the neighborhood caused many complaints. To eliminate this dust-laden water from the air stream, a cyclone chamber was added to the system and the removed water was drained into the storm sewer.

Dust counts taken by the State Board of Health for Wisconsin indicate the air in the general area of the electric furnace contains 6.3 to 14 million particles per cubic foot of 5 to 50 per cent free silica, which is well within the specified limit of 20 million particles per cubic foot.

STEEL CASTINGS

STEEL DIVISION initiated its activities with a technical session devoted to hot tearing of steel castings. The agenda included a formal paper, two research committee reports and a panel discussion. With time running out, bulk of the panel discussion was deferred to the following day's roundtable luncheon.

The paper, **The Stress Required to Hot Tear Plain Carbon Cast Steel: Effect of Tearing Temperature, Composition and Deoxidation Practice,** was authored by H. K. Bhattacharya, C. M. Adams Jr. and H. F. Taylor, Massachusetts Institute of Technology, Cambridge, Mass., and presented by the former.

One conclusion was that hot tearing occurs at austenite grain boundaries, and at elevated temperatures intercrystalline failure results from

Higher outside stacking was made possible with a Towmotor Model 460

STACKING UP SOLID SAVINGS!

Handling brick and tile was a costly, time-consuming job for a leading producer of clay products. Now, with Towmotor **M**ass **H**andling, every pallet of brick moved means a *solid saving!*

It's an idea for you to consider. Find out how Towmotor **MH** can help solve the costly production, storage, shipping and receiving problems in your plant. Your boss will like the idea. Write for booklet, "How To Catch Man-Hour Thieves." TOWMOTOR CORPORATION, Div. 7507, 1226 E. 152nd Street, Cleveland 10, Ohio.

CALL YOUR LOCAL TOWMOTOR REPRESENTATIVE
For fast service and the name of your nearest TOWMOTOR Representative, see the Yellow Pages of your telephone directory.

TOWMOTOR
THE ONE-MAN-GANG®

FORK LIFT TRUCKS and TRACTORS
SINCE 1919
TOWMOTOR ENGINEERED FOR QUALITY PERFORMANCE

strain concentration in the grain boundaries and may be aggravated by weak or brittle constituents at grain boundaries. Temperature at which tearing of cast steel occurs depends upon the timing and severity of resistance to solid contraction. Tearing may occur after complete or partial solidification. This investigation showed that hot tearing can occur at a temperature as low as 1700°F, but it is not known whether it will tear below this temperature under stresses encountered in practice. It is certain it will rupture even at room temperature if enough load is applied.

Further, it was concluded that high sulphur and high phosphorous steels are weak at elevated temperatures and therefore more susceptible to tearing than ordinary commercial steel. Deoxidation practice has some influence on strength of steel. Thus, steels deoxidized with 0.025 to 0.05 per cent aluminum showed lower tearing stresses than those treated with 0.10 per cent aluminum, while deoxidation with 0.2 per cent titanium and 0.1 per cent aluminum was most effective in increasing the tearing stress.

Low-temperature tears—occurring below 2000°F—it was stated, are more dangerous than high-temperature tears because the former are sometimes not visible and hence liable to escape detection unless examined by magnetic or destructive inspection. All cast steels which were studied rupture if restrained at high temperatures. Differences in tearing behavior, which depended upon composition or deoxidation practice, manifested themselves only at temperatures below the solidus.

In discussing this paper, J. B. Caine, consultant, Cincinnati, raised the question as to whether a rupture below the solidus should be called a hot tear. Is it possible, he asked, to differentiate between the two types of defects?

C. H. Wyman, Burnside Steel Foundry Co., Chicago, and chairman of the Steel Research Committee, presented a progress report entitled **Influence of Core Material on Hot Tearing of Steel Castings.** The report covered the period from January, 1953, to the present, a prior report in 1952 covering activities starting in 1948.

In January, 1953, Mr. Wyman explained, the committee got eight foundries to co-operate in making certain test castings. This was done to show the reproducibility of test castings. The castings were made both with weak and strong sand cores and now there is considerable

evaluation of results to be done.

A report on metallurgical investigation which Armour Research Foundation is conducting for the Steel Research Committee was prepared by L. L. Clark of the Foundation, and in his absence it was presented by Jack W. Giddens, a staff member. Using slides generously, Mr. Giddens showed how Armour worked with the test castings to correlate hot tear metallurgy and chemistry.

Second steel session featured two papers. The first, by C. F. Christopher, Continental Foundry & Machine Co., East Chicago, Ind., dealt with **Effect of Pouring Temperature on the Soundness and Physical Properties of Steel Castings.**

Explaining that the temperature relationship between the freezing casting surface and the molten core of the casting determines susceptibility to porosity, the speaker said his paper was a practical interpretation of theoretical equilibrium conditions taking place at the pouring temperature and during the freezing cycle in the mold. It dealt with the resulting oxygen levels and their relationship to the type of inclusion formed as well as with methods and practices used to rectify bad inclusion types or avoid them.

The largest percentage of steel castings is made with 0.20 to 0.50 per cent carbon, Mr. Christopher pointed out. Furthermore, more and more castings are required to meet physical properties and are being required to compete with wrought steels. Unfortunately, quality in 0.20 to 0.50 per cent carbon contents is difficult to make under all conditions. Low-temperature pouring control is a problem in intricate or small castings, although it permits the best deoxidation practice for high physicals.

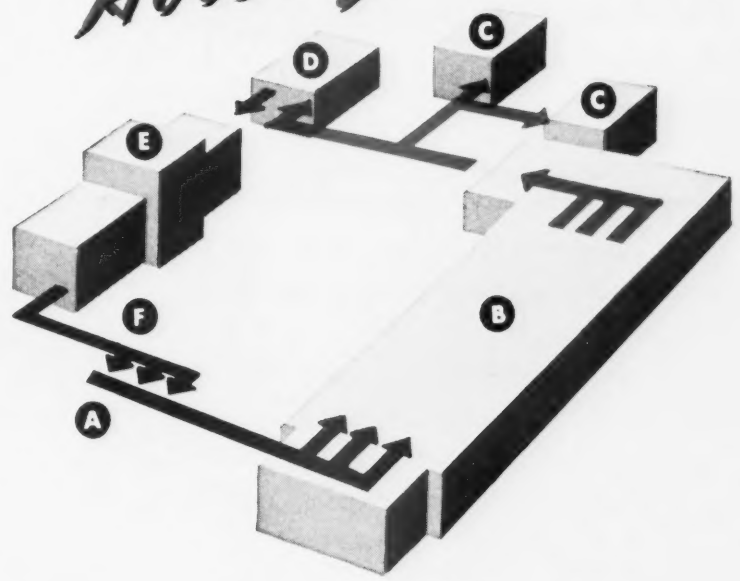
Continuing, the speaker asserted that high-temperature pouring automatically leads to detrimental deoxidation practices to avoid porosity. These circumstances naturally lead some foundries into expensive deoxidizers and rectifiers such as calcium, cerium, titanium, calcium-manganese-silicon, cerium oxide, and many others.

Some foundries deoxidize with silicon alone, avoid porosity, and produce excellent properties. Other foundries use silicon and aluminum to accomplish the same purpose. Still other foundries use all the deoxidizers mentioned. Overdoing or underdoing the deoxidation either hurts the steel or the pocketbook, or

(*Continued on page* 147)

Heat Treat Furnace Layout

by Holcroft ...8th of a Series



A Load
B 3-row Carburizing Furnace
C Press Quench Machines
D Quench Tank
E Both parts feed through single row draw furnace
F Unload

1 Furnace Layout Handles 2 Parts Saves time, man hours; cuts costs

Design experience paid off in this east coast plant. With two parts involved—both receiving the same heat treating cycle, but one requiring press quenching and the other selective hardening—the obvious answer seemed to be two separate layouts.

When given the problem, Holcroft engineers decided one layout would do. The work—drive gears and pinions—is now carburized in a 3-row pusher type furnace. After leaving the carburizing furnace the pinions are quenched by the tray load while the drive gears are individually press quenched and reloaded on trays. Both parts then continue on through the single-row draw furnace.

The results: substantial savings in both time and man-power.

Unusual? Not at all. Just another example of how experience and "know-how" pays off in time, money and job satisfaction.

Write today for complete information. Holcroft & Company, 6545 Epworth Blvd., Detroit 10, Michigan.

BUILT BY HOLCROFT & COMPANY DETROIT · MICH

PRODUCTION HEAT TREAT FURNACES FOR EVERY PURPOSE

CHICAGO, ILL. • CLEVELAND, OHIO • HOUSTON, TEXAS • PHILADELPHIA, PA.

CANADA
Walker Metal Products, Ltd.
Windsor, Ontario

EUROPE
S. O. F. I. M.
Paris 8, France

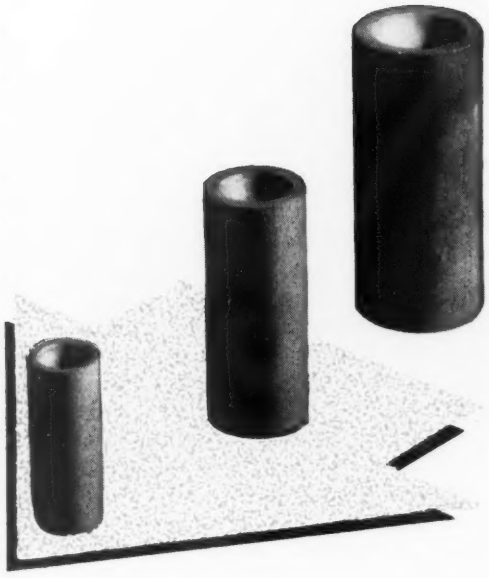
Leading Foundries Use...

NORBIDE® Nozzles

Because . . .

- They get more service per dollar cost (750 hours silica sand — 1500 hours steel shot or grit). NORTON guarantees this minimum service.
- Their air consumption is reduced from 10 to 20 per cent as compared with iron nozzles.
- They maintain stream contour and abrasive velocity.

For full details on cost-cutting NORBIDE Nozzles, write for your free copy of Form 543.



NORBIDE®... *the longest nozzle life you can buy*

NORTON
BORON CARBIDE

NORTON COMPANY

43 New Bond Street • Worcester 6, Mass.

Making better products . . . to make other products better

(*Continued from page* 145)

both, Mr. Christopher declared.

Why Did It Fail? was the title of the second paper, presented by M. V. Herasimchuk, assistant metallurgical supervisor, Bethlehem Steel Co., Bethlehem, Pa. This paper listed case histories on equipment failures but its main purpose was to present a simple procedure for classifying repetitive failures to help foundrymen make rapid analyses of their own problems.

With the method outlined by the speaker, failures can be classified quickly as design problems or metallurgical problems. By concentrating attention on the principal factor responsible for failure, foundrymen can eliminate needless repetitive failures and can show (1) appreciable savings in maintenance costs, (2) increase in production, or (3) a reduction in accident potential.

Some 100 members of the Steel Division attended the roundtable luncheon on May 13. With V E. Zang, Unitcast Corp., Toledo, O., presiding, subjects in the free-for-all and off-the-record discussion ranged through the gamut of steel foundry operations. Hot tears got another play, this being a carryover from a panel discussion which was squeezed out for a time at the opening steel session. Shell molding for steel castings also commanded considerable attention. It developed that although much research on shell molding is being pursued, commercial production of steel castings is limited.

Factors Which Determine Riser Adequacy Feeding Range was one of two papers featuring the third and concluding session. Prepared by W. S. Pellini, Naval Research Laboratory, Washington, it was presented by H. F. Bishop, an associate at the laboratory.

This paper constituted a review of published information on the subject plus some new material. It was stated that since risers must feed castings they must be located properly and be of correct size to do so.

Considerable discussion followed this paper. V. E. Zang, Unitcast Corp., Toledo, O., commented that the average foundry finds it quite complicated to calculate riser size, etc., so it is inclined to skip the mathematics and use instead some arbitrary size which is more than adequate. Consequently, he said that Messrs. Pellini and Bishop were to be complimented on their work which affords considerable simplification.

C. W. Briggs, Steel Founder's Society of America, Cleveland, asserted that if a riser allows for 3 per cent contraction during freezing of the casting it usually will function properly. However, he warned, it doesn't always prove adequate and it sometimes becomes necessary to calculate the volume.

Second paper at this session, prepared by R. W. Wilson, assistant foundry superintendent and chief metallurgist, American Hoist & Derrick Co., St. Paul, was **Design and Operation of a Modern Heat Treating Department.** In absence of the author, presentation was made by D. W. Schuler of the same company.

At the outset it was pointed out that furnaces, quenching systems and materials handling equipment must be selected on the basis of heat treating operations required and possible future expansion. Therefore, generalities only can be discussed. The author described heat treating equipment which in the case of his own company has made possible production of uniformly machinable castings and uniformly hard castings, free of scale and decarburization, when hardened after machining.

CORE and MOLDING SAND

A SAND roundtable luncheon opened the extensive Sand Division program, which also included six technical sessions. F. S. Brewster, Harry W. Dietert Co., Detroit, presided at the luncheon, where an unusual program was presented. Each of the sand division committee chairmen spoke briefly on the past, present and future activities of his group and asked for suggestions from the floor as to how to improve the value of those activities. No such suggestions were offered, however.

In his opening remarks, Chairman Brewster noted that the committees and subcommittees exist only to serve the needs of members of the Sand Division. He then turned the meeting over to Elmer Zirzow, Werner G. Smith Co., Cleveland, who had organized the luncheon meeting. Mr. Zirzow conducted the balance of the program at the session.

First paper at the opening technical session was **Another Look at Sand Grain Distribution** by B. H. Booth, Carpenter Brothers Inc., Milwaukee, and C. A. Sanders, American Colloid Co., Chicago. Presented by Mr. Booth, the paper discussed terminology for describing the various classifications of foundry sand. It was contended that a fineness number or screen distribution are not sufficiently precise in their definition. Although grain distribution curves have proved useful to foundrymen, there is the question as to what constitutes a demarcation between percentages which cause a given size to be counted as a screen or as no-screen. The speaker urged that a satisfactory explanation of grading sand grain distribution be sought so that foundrymen may have a common language when speaking of sand.

Earl E. Woodliff, Detroit sand consultant, in a written discussion said that sand screening in itself is inaccurate because a given size sand grain does not always go through the same size hole. In ten tests, ten different percentages of grains can be shown. Furthermore, screens quickly get out of calibration.

The second paper, **Fundamentals Make Better Castings,** by L. L. Clark, Armour Research Foundation, Chicago, called for a more intelligent approach to sand preparation and handling. The speaker advocated a simple sand with few additives to complicate preparation. Since the production of saleable castings depends to a great extent upon proper molding sand much thought and consideration should be given to its formulation.

The speaker suggested that one man be placed in charge of sand preparation for the entire foundry for all shifts. All ingredients should be weighed precisely, and water content should be controlled carefully, using as little as will do a satisfactory job. A control program, regardless of size, should be instituted and followed. And finally, good interpretation of casting defects will help in proper sand control procedures.

The official exchange paper from the Institute of Australian Foundrymen by Paul Markwell, McLean Castings Ltd., Sydney, Australia, was presented by R. W. Bennett, Walter Gerlinger Inc., Milwaukee. Entitled **Zircon Sands—Occurrence and Uses in Australian Industry,** the paper covers briefly the mineralogy

and commercial deposits of zircon sands in the Australian states of Queensland and New South Wales. Their properties as a molding material and mold coating are described as high refractory value, high conductivity, high density, low expansion, resistance to being wetted by molten metal and uniformity.

They are said to require less bonding material than silica sands, possess high hot strength, and produce castings with good surface finish and definition. However, they are high in cost, not easily obtainable and there is a lack of information covering use experience.

The second sand session program was comprised of three papers, first of which was **Casting Quality as Related to the pH Value of Molding Sands,** by Victor E. Zang and G. J. Grott, Unitcast Corp., Toledo, O. Mr. Grott presented the paper. This subject was treated in an article by the same authors which appeared in FOUNDRY for June, 1954. Discussion centered around the value of this contribution to sand control literature and the need for more research on the subject of pH value.

C. E. Wenninger, National Engineering Co., Chicago, presented the second paper, **Selection and Mulling of Synthetic Sands.** Purpose of his presentation was to stimulate thinking with respect to what is fundamental to foundry sands and sand controls.

Mr. Wenninger pointed out that the ceramist watches size and shape of aggregate materials to promote their orderly packing and that this physical arrangement can improve the density and stability of aggregate particles, such as a rammed sand mass, in addition to the effect of binders which fill voids and cement particles together. He also noted the need for intensive mulling to arrange sand grains so that they pack properly when rammed.

Concluding speaker at this session was Burdette Jones, John Deere Waterloo Tractor Works, Waterloo, Iowa, whose paper was **Pre-Mixing of Reconditioning Materials for Molding Sand.** Mr. Jones described a homemade blending unit for such premixing which replaced the former system at the plant. The latter involved adding reconditioning materials at each of eight molding units. The new unit was reported to save equipment, labor, space and material and to lower dust. Mixes can be prepared in advance for different jobs and can be held for up to ten days. Further advantages include better control over mulling, since records can be kept on the operation very easily, and the morale improvement of the men on the sand mixer decks.

Shell molding and pressure molding of green sand were covered in three papers at the third sand session. E. I. Valyi, A. R. D. Corp., Yonkers, N. Y., in his paper, **Recent Developments in Shell Molding,** summarized the developments as reduced resin costs; the introduction of precoated sands which are being used economically for cores but which

"Donahoe, who told you how to use salt tablets?"

are not yet developed sufficiently for making molds; advances in production equipment; the making of molds with properly matching cope and drag rather than merely shells; simplified backing of shell molds, and the elimination of backing material in many cases. Coated sands also have permitted blowing cores which can not be done with dry mixes because they segregate during the blow.

Pressure Molding with Standard Synthetic Sands by T. E. Barlow and W. R. Adams, Eastern Clay Products Dept., International Minerals & Chemical Corp., Chicago, was presented by Mr. Barlow. The paper covered tests made with ordinary molding sand formulations in molds either jolted, jolt squeezed or merely squeezed at 100 psi on a rubber diaphragm molding machine. Results indicate that ordinary mixes which are jolted only, produce denser molds than the 100 psi diaphragm machine. Practice shows however, that a high flowability, low moisture content sand will be denser with the high pressure diaphragm squeeze machine. The speaker pointed out that the size of castings produced in dense molds is closer to pattern size than that of castings produced in ordinary sand molds.

Discussion brought forth the comment that the depth of a sand pocket in a mold has no effect on proper operation of the diaphragm if the depth is not more than three times the width.

Third paper at this session, **Research on Shell Molding,** was by R. G. Powell, C. M. Adams Jr. and H. F. Taylor, Massachusetts Institute of Technology, Cambridge, Mass. It was presented by Mr. Powell and covered strength test studies of factors which influence resin consumption in making shell molds. Conclusions were as follows:

A wide variation in bonding efficiency exists among various phenolic resins. Proper curing of shells is important in developing maximum bonding efficiency of a resin. Surface coating of sand consumes extra binder which contributes little to shell mold strength, and since large grains have less surface area than small grains the coarsest sand that still produces satisfactory casting surfaces should be used. Within limits, sand grain size distribution has little effect on shell strength. However, for a given coarseness of sand, better surface finish may be obtained on castings when sand of wide grain size distribution is used. Since angularity of sand grains contributes to binder consumption, it was suggested that rounded sand grains may be desirable. It also was shown that clean zircon sand produces stronger shells than silica sand, due to higher affinity of resin for zircon.

Additional findings were that sand cleanliness influenced the amount of resin used, and also that resin consumption might be reduced as much as 50 per cent by vibrating the pattern during the dwell period.

Mr. Valyi, in a written discussion, stated that the degree of shell curing should vary, depending upon the metal to be poured. He also suggested that with reduced percentages of resin now required with the use of additives, consideration should be given to employing sand reclaiming equipment.

Fourth session papers dealt with core blowing and olivine-silica molding sands. J. A. Mescher, Unitcast Corp., Toledo, O., opened the session by presenting his paper, **Coreblowing Problems.** He discussed various types of coreblowing machines and offered suggestions on corebox maintenance and reduction of set-up time.

The second paper, **What Is Stickiness in Core Sand Mixtures?,** by W. H. Buell, Aristo Corp., Detroit, was

(Continued on page 150)

THE NEWEST AND MOST REVOLUTIONARY DEVELOPMENT

IN THE 82 YEAR HISTORY OF THE ABRASIVE INDUSTRY

CUT STEEL

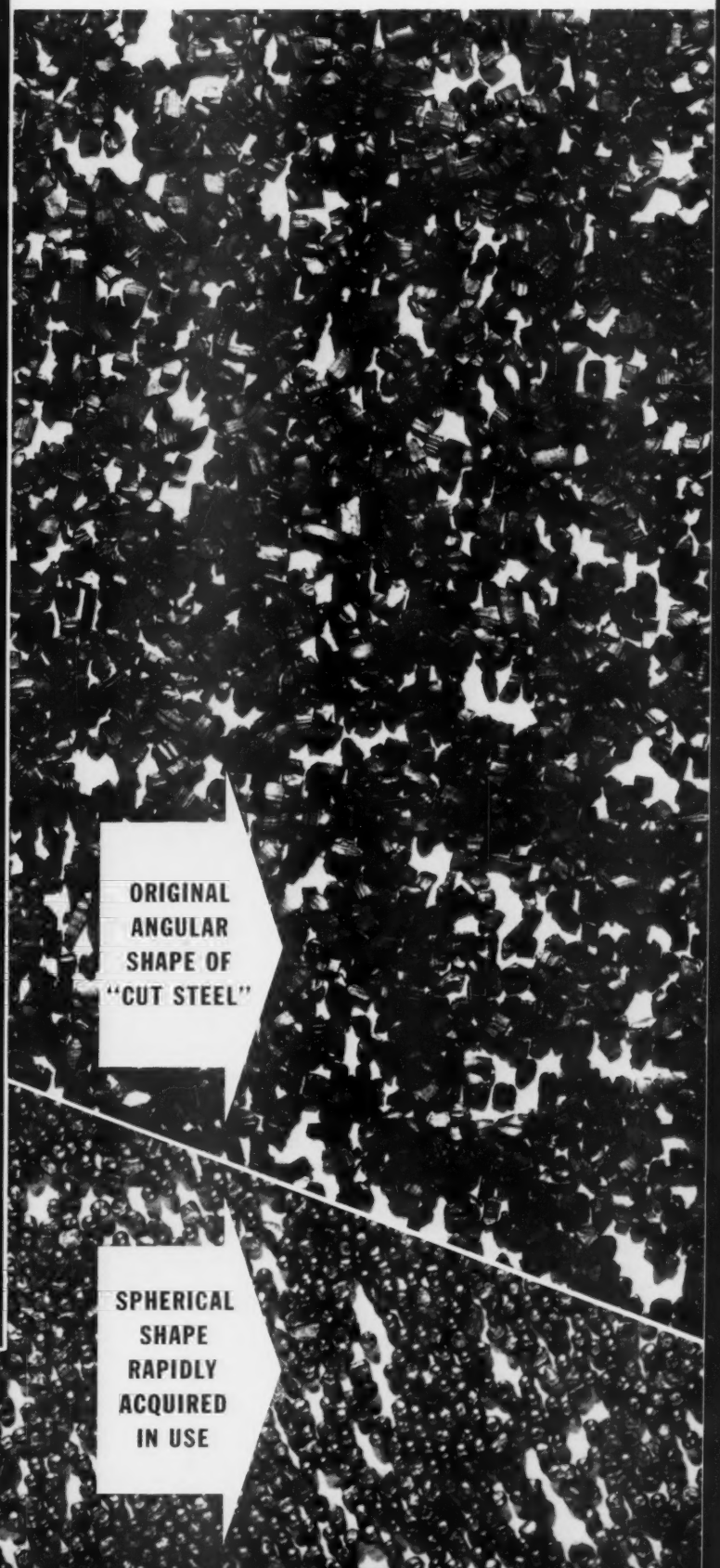
• Metal Blast is proud to introduce "Cut Steel"—an *entirely new* type of abrasive that produces amazing results in the blast cleaning of castings and forgings. Composed of small cut-steel particles in a variety of shapes and sizes, it somewhat resembles steel grit in appearance. It's made of the finest high-carbon, high-chrome, alloy steel and heat treated for maximum efficiency. Because of its distinctive shape and structure, "Cut Steel" performs differently than any other abrasive. It changes shape rapidly in use (see arrows) and it work-hardens to a maximum Rockwell "C" hardness of 45 to 50.

"Cut Steel" outperforms all other abrasives. It produces a *better* finish—cleans *faster*—lasts *longer* than any other abrasive, even cut-wire—and is surprisingly *easy on equipment*.

Despite these exclusive advantages, "Cut Steel" is not expensive. Grade "A" sells for *less than most cast steel shot*. Grade "B" sells at *malleable shot prices*. Both grades available in ten sizes.

We'll gladly rush samples and descriptive literature—or ship a trial order.

METAL BLAST, Inc.
871 EAST 67th ST., CLEVELAND 3, OHIO
manufacturers of
ANNEALSHOT, SUPER-ANNEALSHOT, CUT STEEL ABRASIVES



SOONER *or* LATER *you'll change to* CUT STEEL

(*Continued from page* 148)
a progress report on work of the AFS Core Stickiness subcommittee. Mr. Buell stated that stickiness, which is the tendency of sand to adhere to a pattern surface, is evaluated by the amount of adhering sand, the force required to remove it, and smoothness of the core surface. Tests were conducted on several sand mixes made with varying amounts of water, core oil and fly ash. As yet, however, results are inconclusive and not ready for release.

There is a major problem in formulating sands because enough adhesive must be used to hold the grains together and yet not so much that the sand will stick to the pattern. Practically all sands, according to the speaker, will stick to the box beneath a blowhole.

It was stated, during the discussion period, that polarity of a corebox affects sticking and that a study of stickiness should include observation of polarity effect.

A study of **Olivine-Silica Molding Sands** by G. S. Schaller and W. A. Snyder, University of Washington, Seattle, concluded the session. The paper was presented by Mr. Snyder, who stated that the mixture is satisfactory as a molding material for all metals except steel because the mix has a lower fusion point than the individual sands. Although olivine sand does not have a definite fusion point, it does fuse at a higher temperature than silica sand.

Tests were conducted by pouring steel into molds of olivine flour with silica sand, olivine and silica aggregate and olivine and silica sand combinations. Results indicated that olivine flour can be used in place of cereal flour additions but that the aggregate and sand combinations were unsatisfactory. It also was found that an olivine sand facing with silica sand backing was beneficial. Results were judged primarily on the basis of satisfactory casting surface finish.

Fifth sand session was concerned with casting finish. **A Method of Establishing Standards for As-cast Surfaces,** by Roy Loder, Erie Malleable Iron Co., Erie, Pa., described a procedure for preparing standards to cover the range of finish on castings the company produces.

The medium of comparison selected was eight grades of sandpaper ranging from 4/0 to 1½-40 grit. To provide durable specimens, sheets of sandpaper were glued to wood blocks, mounted on the cope side of a pattern plate and a mold prepared of No. 00 Albany sand. Aluminum was poured into the mold and the cast blocks, numbered 1 to 8, were mounted in wood and covered with lucite to preserve the surfaces. On new casting jobs the foundry is given the finish number desired. Experience with sand mixes and molding methods permits the foundry to produce castings to the specified surface finish.

"I don't care how they did it in the Army, that's not the way we give inoculations here!"

Improving Surface Finish on Gray Iron Castings, by W. G. Parker, supervisor of development of foundry materials, General Electric Co., Elmira, N. Y., described efforts to obtain not only a better finish but also closer tolerances through use of different sand mixtures. In the experiments the various mixtures included an AFS No. 135 New Jersey silica sand, AFS No. 275 and No. 103 McConnelsville sand and a silica flour No. 325 mesh as the aggregate. All of the molds were rammed extremely hard.

The speaker declared that good finish and close tolerances can be obtained by conventional methods but that future adoption of the fine sands in production work depends on various factors, chief of which are the economics and customer requirements. Grain size and distribution of the fine sands should be the chief consideration in selecting the sand to be used.

Statistical Analysis of Factors Affecting Casting Finish, by D. C. Ekey and J. E. Goldress, Pennsylvania State University, and presented by Professor Ekey, described a study of the effect on green sand castings, surface finish of these four factors: Sand fineness, mold hardness, metal pressure and wood flour. All other elements were held relatively constant and each mold used in the experiments contained by weight 10 per cent southern bentonite and 5 per cent water. All castings were poured with new aluminum alloy in stack molds. Results of the investigations indicate that both sand fineness and metal pressure have a significant effect on surface roughness but that wood flour has no effect. No conclusions were obtained regarding mold hardness effect because no correlation was found to exist between the differences in weights applied during mold jolting and the resulting hardness.

Investigation of Steel Foundry Sands at Elevated Temperatures, a progress report, was presented at the concluding sand session by O. P. Eberlein, Cornell University, Ithaca, N. Y. The report was prepared by Mr. Eberlein, R. G. Thorpe, R. C. Waugh and P. E. Kyle of Cornell. It discusses studies of the relationship of sand expansion and deformation to scabbing tendencies of the casting.

Effect of Moisture Content on Silica Sand, by E. D. Sayre, Aircraft Gas Turbine Division, General Electric Co., Cincinnati, and C. T. Marek, associate professor, Purdue University, summarized studies to determine how moisture affects bulk density, mold hardness and compressive strength of silica sand. Four different grain sizes were used and the moisture content was varied from zero up to the inundation point.

It was found that bulk density decreases as water is added, and then rises to a maximum near the point of inundation, when the sand grains are almost as closely packed as dry sand. Hardness and compressive strength increase accordingly, approaching a constant maximum as moisture content increases. Minimum bulk densities of the various sands drops as grain size decreases, accompanied by greater maximum strength and hardness.

It is the authors' belief that further study of molding components on each other, such as the effect of moisture—with and without certain inhibitors and activators—on various types of fillers and binders would contribute greatly to sand technology. They maintain that such work, if done on a scientifically sound basis, should make it possible to produce sands designed to fit specific casting jobs, resulting in more economical production of higher quality castings.

Progress report of the Sand Division's Mold Surface Committee

(*Continued on page* 152)

Check the advantages of melting and remelting quality steel with TOCCO Induction Heating

Several TOCCO melting furnaces may be operated from one TOCCO high-frequency power source.

Some Users of TOCCO High-Frequency Melting Furnaces

American Electro Metal Corp.
Haynes Stellite Company
E. I. Dupont de Nemours & Co.
Union Carbide and Carbon Corporation
Allis-Chalmers Mfg. Co.
Watertown Arsenal
Wright Aeronautical Corporation
Watervliet Arsenal
Arwood Precision Casting Co.
Various Atomic Energy Plants and Laboratories

- ✓ Extremely Rapid Melting
- ✓ High Efficiency on Intermittent Operation
- ✓ Good Mixing because of Natural Agitation
- ✓ Extremely Low Alloy Loss
- ✓ High Reproducibility of Results
- ✓ No Carbon Pick-up
- ✓ No Contamination when Composition of Charges is Changed
- ✓ Minimum Space Requirements
- ✓ No Special Installation Charge
- ✓ Simple, Safe Operation
- ✓ Clean, Comfortable Working Conditions

If any of these advantages suggest economies in your operations write us for full details—no obligation, of course.

THE OHIO CRANKSHAFT COMPANY
CLEVELAND 1, OHIO

TOCCO*

*Trade Mark Reg. U. S. Pat. Off

Hardening • Brazing
Annealing • Soldering
Forging • Melting

(*Continued from page* 150)
8-H on **Metal Penetration Tests on Dry Sand Cores and Core Washes** was presented by its chairman, C. C. Sigerfoos, associate professor, Michigan State College. This report describes tests of dry sand cores prepared with four different densities and consisting of a mixture of Lake Michigan sand, cereal, core oil, iron oxide and water. A graphite-base wash at 18 Baume and a silica-flour-base wash at 58 Baume were applied to different core specimens. In the test molds the cores were subjected to a 20-in. head of gray iron which was poured at a temperature of 2650° F.

These tests showed that the silica wash prevented penetration but that the graphite wash allowed the metal to penetrate at the corners of the specimens, a condition not altered by increasing the Baume of the wash. Variation in ramming (density) gave no apparent difference in penetration, although there was a very slight improvement in unwashed control specimens as core density increased. In general, the wash was heavier on the lower density core specimens.

GRAY IRON

BEGINNING with a roundtable luncheon gray iron foundrymen had a busy three days involving five technical sessions. The wide array of topics discussed included machinability, fluidity, cupola operation, cooling rates, risering of castings, injection of calcium carbide, spherulitic cast iron, effect of graphite size, oxygen in cast iron and relationship of carbon equivalent to mechanical properties.

The opening roundtable luncheon was attended by about 60 persons who heard L. N. Shannon, Stockham Valves & Fittings Inc., Birmingham, Ala., relate the **Highlights of Our European Trip.** Mr. Shannon headed a delegation of American foundrymen to the International Foundry Congress in France in 1953 and he told of his experiences at the Congress as well as his impressions of France, Italy, Switzerland, Germany, Belgium, and England, with interesting sidelights on industrial plants visited in each country.

J. E. Rehder, Canada Iron Foundries Ltd., Montreal, also attended the Congress in France, and presented some interesting facts about **European Metallurgy and Melting Practice** as he observed it.

European Molding, Core Making and Production Equipment was the subject of F. M. Kulka, Motor Castings Co., Milwaukee, who also was in the European delegation last year. In Mr. Kulka's opinion, of all the European countries he visited, Germany alone doesn't seem to be living in the past although there is a general reawakening of things mechanical and technical. Good craftsmanship is evident everywhere but, generally speaking, except in Switzerland, modern equipment and methods of production are lacking.

Three papers were presented at the first technical session: **Studies on Machinability and Microstructure of Cast Irons,** by E. A. Loria, Carborundum Co., Niagara Falls, N. Y.; **The Machining Characteristics of Cast Irons,** by Michael Field and J. F. Kahles, Metcut Research Associates, Cincinnati, and **Fluidity vs. Core Blows in Automotive Gray Iron,** by A. A. Evans, International Harvester Co., Indianapolis.

The first two papers on machinability ran almost parallel and to practically the same end, that being the relationship of metal removal to microstructure and tool wear.

It was shown that hardness of iron depends upon its microscopic composition of graphite, ferrite, pearlite, steadite and carbide, with carbide some forty or fifty times as hard as graphite. Tests showed that the machinability of iron from the same ladle varies drastically in relation to its cooling rate and that usually the stronger the iron, the harder it is to machine.

However, malleable or ductile irons with graphite in the form of nodules or spheres instead of flakes machine readily in spite of their much greater strengths. While the foundryman, working with the machinist, is bound to arrive at these same general conclusions, the object of the research activities was to establish measurable and predictable degrees of the effects of microstructure on machineability.

More of a practical nature, the third paper described International's search for the cause of spasmodic epidemics of core blows. Following quality control procedures, fluidity of iron was singled out from other factors, including temperature of iron, as the cause. A rather novel fluidity test was developed in the process.

At the second session, in a paper **Theoretical Aspects of Oxygen in Cast Iron** by B. B. Bach, British Cast Iron Research Association, Birmingham, England, which was presented by H. W. Lownie Jr., Battelle Memorial Institute, Columbus, O., the author provided thermodynamic treatment of the reactions occurring when cast iron is melted. He pointed out that while those data may be applied qualitatively to predict the effects of temperature, pressure, carbon and silicon on oxygen content of cast iron, considerably more investigation of various gas-metal systems has to be made before the data can be applied quantitatively.

In a written discussion, H. R. Clark pointed out that polarization gas films tended to form around oxides, and permitted them to exist in harmful quantities.

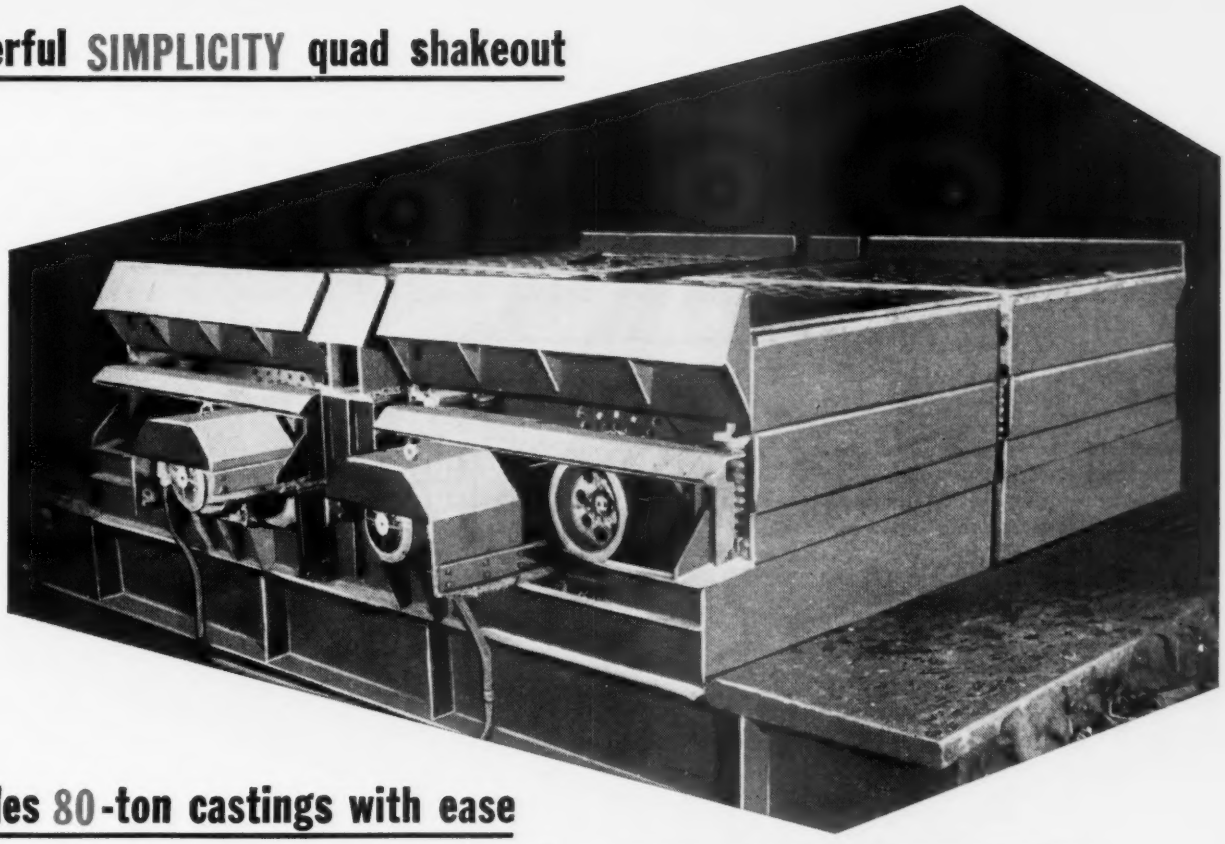
Ralph Carlson, American Cast Iron Pipe Co., Birmingham, Ala., discussed **Some Variables in Acid Cupola Melting** based on data prepared in co-operation with Sam Carter of the same firm. Coke size was found to affect all reactions in the cupola, and best performance was obtained with a coke size ranging from 8 to 15 per cent of the cupola diameter. Such coke gave highest temperature, highest carbon, lowest oxidation loss, cleanest tuyeres, least bridging, and most favorable slag condition. With low coke percentages, melting rate is high and sulphur absorption low, but oxidation losses are high as well as FeO in the slag, and the temperatures and carbon contents lower.

With increased coke, output is decreased but oxidation losses are lower, temperature increases and slag composition is more favorable. Above the optimum coke, advantages decrease. With a fixed coke amount, overblowing gives high melting with lower temperature, high oxidation loss, high refractory consumption and lower carbons. With extremely low air volume, temperature and thermal efficiency are reduced. Variations in steel scrap can cause considerable variation in cupola performance. High-carbon steel such as rails and springs produces higher carbon and silicon than does plate and structural steel. Size of steel scrap is important and should not be under $\frac{1}{8}$-in. in thickness. Best results are obtained with pieces of steel scrap in an intermediate weight range of moderate thickness and a shape giving intermediate permeability.

Cupola Melting of Cast Iron Borings and Turnings was the subject

(*Continued on page* 154)

Powerful SIMPLICITY quad shakeout



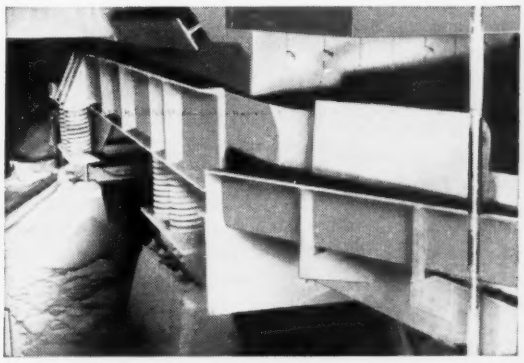
handles 80-ton castings with ease

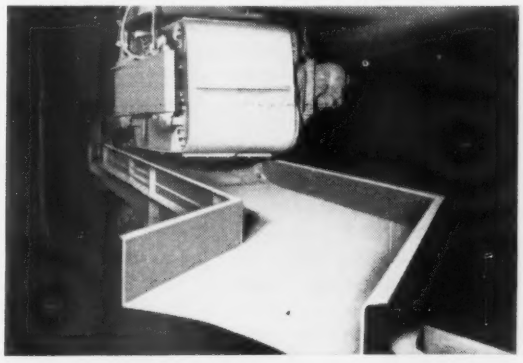
This is the Simplicity spring-mounted quad shakeout, made up of four 7′ x 8′ steel-decked Simplicity Model OM units, that is handling huge 80-ton tank hull castings for a well-known foundry.

After plenty of pounding by the big 80-ton castings, the deck of the Simplicity unit is still in sound condition. Controlled vertical vibration, concentrated at the deck, eliminates travel of flasks and castings and does a more thorough shakeout job in less time.

In the same foundry, a 4′ x 20′ Model OA Simplicity Feeder, installed under a hopper beneath the shakeout, feeds sand to the return conveyor for reclaiming without hang-up or bridging in the hopper.

This 3′ x 20′ Simplicity Model VS Conveyor, connected to the Simplicity Feeder, insures the smooth, even flow of sand back to the reclaiming unit. It is equipped with a Dings self-cleaning magnetic separator that removes all metal particles from the sand.





136

Sales representatives in all parts of the U.S.A.
FOR CANADA: Canadian Bridge Engineering Company Ltd., Walkerville, Ontario
FOR EXPORT: Brown and Sites, 50 Church Street, New York 7, N. Y.

Simplicity
TRADE MARK REGISTERED
ENGINEERING COMPANY • DURAND, MICHIGAN

(*Continued from page* 152)
of the official exchange paper of the Institute of British Foundrymen, and was presented by William Y. Buchanan, John Lang & Sons Ltd., Johnstone, Renfrewshire, Scotland. He reviewed early efforts along that line, referring to Whitney's use of wood boxes, Prince's employment of steel tubes in the center of the charges, and Ronay's briquetting of borings. After describing his own experiments with cement-bonded borings, packing them in cans, and use of a 600-lb crucible, Mr. Buchanan discussed development of a suitable cupola procedure.

Present melting of borings is conducted in a short stack, 32-in. cupola. Charging platform is about 4½ ft above the tuyeres, and the diameter of the stack at that point was increased to about 45 in. Coke bed is about 42 in. above the tuyeres, cupola shell is cooled with a water spray, and the blast is about 500 cu ft per minute. Charges are composed of 379 lb borings, 56 lb coke, and 8 lb limestone mixed together and shoveled into the cupola to maintain a height from 18 in. to 2 ft above the bed. Melting rate is around 1 ton an hour with a melting loss of slightly over 1 per cent.

In the discussion C. R. Austin, Meehanite Corp., New Rochelle, N. Y., directed attention to a system of melting borings whereby they are charged into the cupola just above the tuyeres with specially designed equipment. Details relating to the method were presented in the July, 1952 issue of FOUNDRY.

At the third session the exchange paper from the Institute of British Foundrymen, Victoria Branch, by G. J. Benson, Melbourne Technical College, Melbourne, Australia, and entitled **Australian Methods of Producing Special Pipes,** was read in name only. The paper points out production methods used in Australia for large gray iron pipe and fittings, with detailed emphasis on explanation of methods used in sweep molding large tees and elbows, including the hold-down plate and the core arbor.

Jules Henry, Forest City Foundries Co., Cleveland, presented a paper on the **Importance of Cooling Rate on Physical Properties of Gray Cast Irons.** Mr. Henry pointed out that other factors beside section size alone can change the properties of gray cast iron by as much as 25 per cent when changes are made in the cooling rate through the lower critical stage. The author elaborated on several tests conducted to show that the strength and hardness of gray iron can be increased by shaking out castings while they are above the austenite-pearlite transformation temperature. It also was discovered during these tests that the addition of alloys to gray iron increases the sensitivity of the iron to shakeout at high temperatures and the tensile strength and hardness of the alloyed iron can be increased by cooling rapidly through its lower critical temperature.

The author was careful to point out that more data are needed on

"Maintenance? How in the devil do ya work these darn new fangled fork lift things?"

cooling rates before exact figures can be advanced as to the quantitative effect of cooling on the physical properties of gray cast iron.

Risering of Nodular Iron by R. C. Shnay and S. L. Gertsman, Department of Mines and Technical Surveys, Ottawa, Ont., Canada, was the subject discussed by Mr. Shnay. His paper revealed the results of experimentation as the first step in a project to develop data on risering of nodular iron. Some of the conclusions drawn were: Nodular iron feeding requirements are somewhat similar to those of steel; minimum riser height needed to eliminate under-riser shrinkage at maximum feeding distance is less than 1½ times riser diameter for ½ to 1½-in. plates; feeding requirements of ½ and 1-in. plate appear to be insensitive to the composition fluctuations as encountered in the study.

Gray Iron Research Progress Report No. 5, **Risering of Gray Iron Castings,** by W. Schmidt, E. Sullivan, and H. F. Taylor, Massachusetts Institute of Technology, Cambridge, Mass., was presented by Mr. Schmidt. The report covers the last phase of the AFS research program to determine those factors which influence the shrinkage behavior of plain iron-carbon-silicon alloys cast in sand under typical foundry conditions.

The experimental results indicate from both an experimental and theoretical standpoint that most normal gray irons shrink; total measured shrinkages are generally somewhat lower than theoretical shrinkages; those factors which affect shrinkage are related to the type of graphite formed; while, for many grades of iron, shrinkage should occur during eutectic, the presence of small quantities of gas could prevent this shrinkage; if voids are formed by gas they do not result in measurable variations in density of irons at room temperature; and finally, certain green sand molds can contribute materially to erratic shrinkage behavior.

Lead-off paper at the fourth gray iron session was **Graphitization of Magnesium Treated White Iron,** by F. J. Walls, International Nickel Co., Detroit, C. M. Hammond, W. B. Pierce, and R. A. Flinn, all of University of Michigan, Ann Arbor, Mich., and was presented by Mr. Hammond. It described melting of 300-lb heats of three different compositions of magnesium-treated cast iron which were poured into step-bar castings. Sections of the step bars ranged from ⅛ to 1-in. in thickness. In the as-cast state the structures ranged from white fracture in the thin sections to spheroidal graphite in the heavier. Bars were subjected to various heat treatments, and it was found that immersion in molten salt or lead baths for a short period of time resulted in satisfactory graphitization of the light sections.

Calcium Carbide Injection—a New Metallurgical Tool for the Foundryman, by J. M. Crockett, Air Reduction Sales Co., New York, and H. E. Henderson, Lynchburg Foundry Co., Lynchburg, Va., was discussed by the latter.

For desulphurizing, calcium carbide is fed into the molten iron at the rate of 2 to 6 lb per minute with a stream of dry nitrogen gas flowing at the rate of 100 to 150 cu ft per hour. Injection is by a graphite nozzle projecting a minimum of 8 in. beneath the surface of the bath, or preferably one-half the depth of the ladle. Ten pounds of carbide removes 1 pound of sulphur, and sulphur can be reduced to 0.01 per cent if desired.

Treatment of iron with carbide results in decreasing chilling tendency and improvement in tensile strength in the range of 12 per cent in higher strength irons to 38 per cent for those with 30,000 psi strength. The reduced chilling tendency also provides the possibility of substituting lower cost alloy additions to obtain desired mechanical properties.

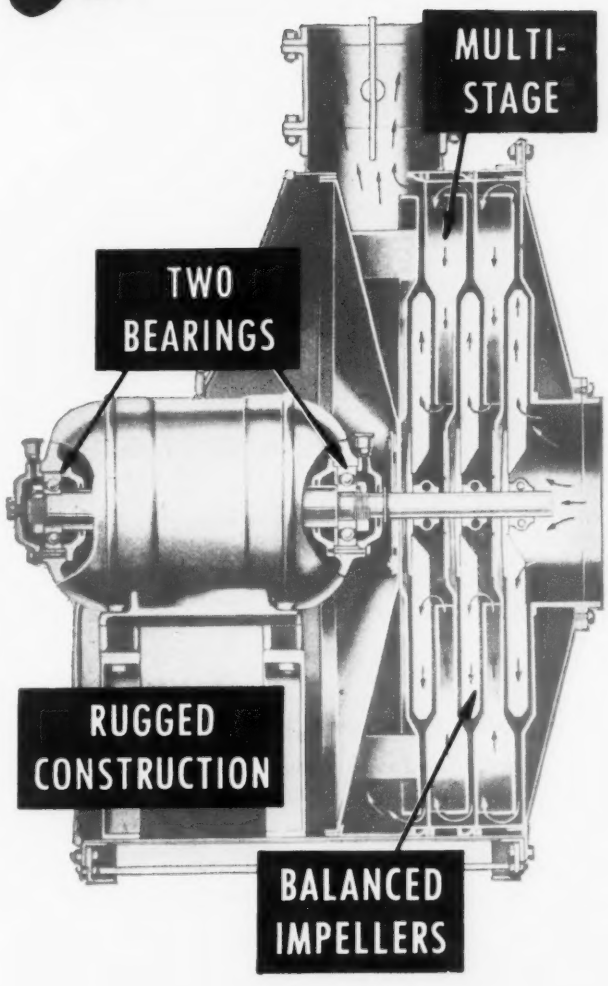
In the discussion questions were asked about trouble with plugging of the injection tube, loss of temperature during treatment, and whether the tube size had to be

(*Continued on page* 161)

CONTINUOUS PRODUCTION

Assured 4 Ways

WITH SPENCER TURBO-COMPRESSORS



There are good reasons why the annual installation of Spencer Turbos has increased tenfold in ten years and why a recent analysis shows that repair parts amount to less than one dollar per machine per year.

No. 1. The Spencer multi-stage construction allows a smaller diameter machine with lower peripheral speeds of the fan blades and of the motor itself. The wear on the bearings is therefore cut to a minimum.

No. 2. The only rotating contacts are at the two ball bearings, which if kept greased will assure satisfactory operation without work stoppages for many years.

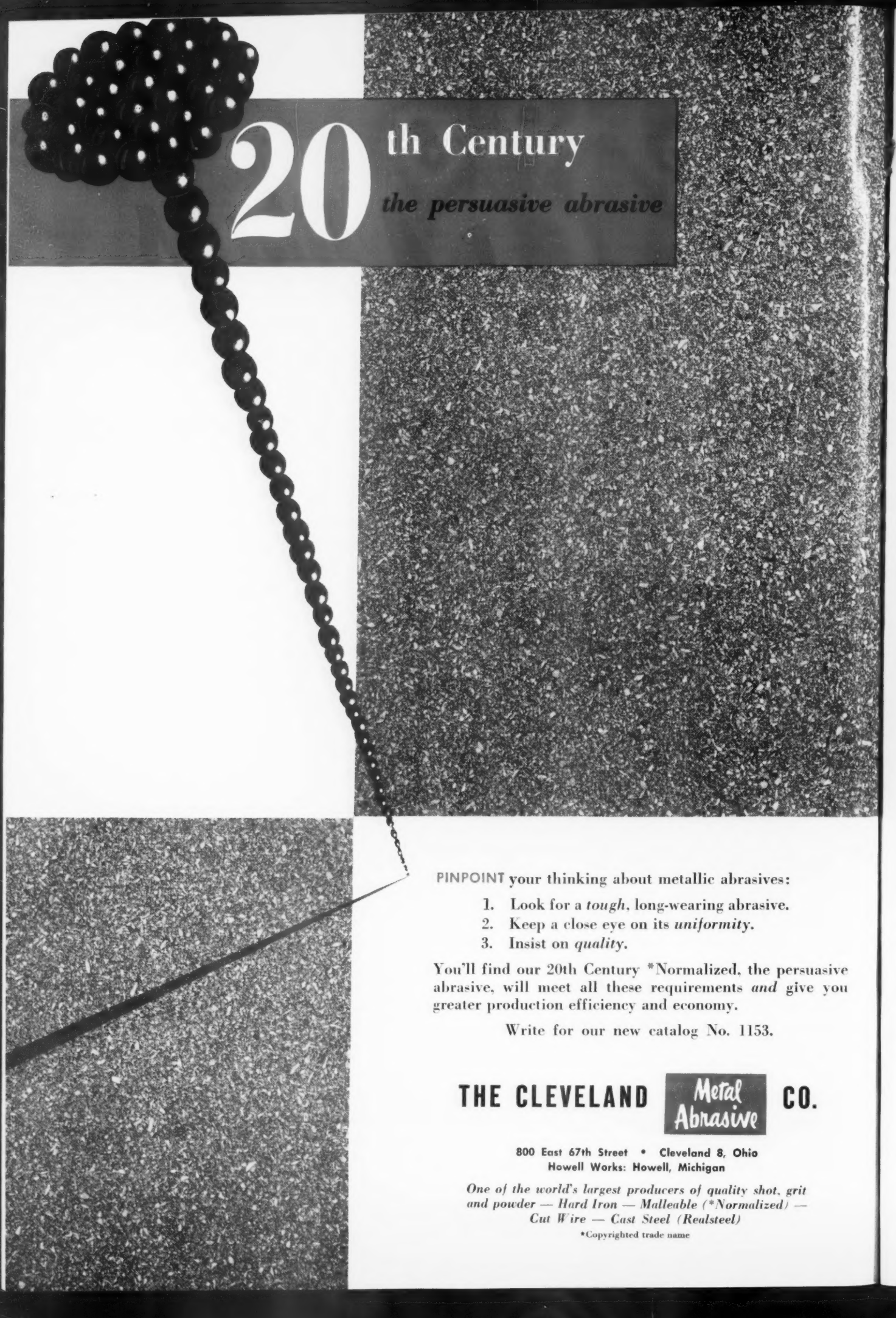
No. 3. Here is a machine as simple as an electric fan, with a rugged construction, as sturdy as a steel bridge and with wide clearances between the rotating elements and stationary parts. Users say "the Spencer goes on forever with little attention."

No. 4. Balanced Impellers. Each fan is individually balanced before the machine is assembled. This decreases the vibration, increases the life of the bearings and packing and produces quiet performance.

35 TO 20,000 C.F.M.; 4 OZ. TO 10 LBS.; 1/3 TO 1,000 H.P. 440-H

THE SPENCER TURBINE COMPANY • HARTFORD 6, CONNECTICUT

SPENCER
HARTFORD



PINPOINT your thinking about metallic abrasives:

1. Look for a *tough*, long-wearing abrasive.
2. Keep a close eye on its *uniformity*.
3. Insist on *quality*.

You'll find our 20th Century *Normalized, the persuasive abrasive, will meet all these requirements *and* give you greater production efficiency and economy.

Write for our new catalog No. 1153.

THE CLEVELAND Metal Abrasive CO.

800 East 67th Street • Cleveland 8, Ohio
Howell Works: Howell, Michigan

*One of the world's largest producers of quality shot, grit and powder — Hard Iron — Malleable (*Normalized) — Cut Wire — Cast Steel (Realsteel)*

*Copyrighted trade name

FOUNDRY STATISTICS

MALLEABLE IRON

(Shipments of castings—net tons[1])

	Shipments—Total	Shipments—For Sale	Unfilled Orders[2]
1952	926,120	573,472	.....
1953			
Mar.	94,481	57,025	177,776
3 mo.	268,245	162,260	.....
Apr.	95,923	57,757	174,514
May	82,050	48,011	160,387
June	86,514	50,819	151,016
July	77,111	45,413	137,251
Aug.	73,855	45,415	120,801
Sept.	74,333	45,466	114,523
Oct.	73,473	45,515	104,046
Nov.	63,435	37,500	93,156
Dec.	72,126	39,657	95,612
Total	967,065	577,813	.....
1954			
Jan.	70,288	38,266	85,565
Feb.	69,078	37,792	81,579
Mar.	84,352	47,135	74,219
3 mo.	223,718	123,193	.....

COPPER-BASE ALLOY

(Shipments of castings—1000 pounds[1])

	Shipments—Total	Shipments—Sand	Shipments—Perm. Mold	Unfilled Orders[2]
1952[3]	1,009,910	910,862	63,865	.....
1953[3]				
Mar.	92,798	83,639	5,716	69,490
3 mo.	263,762	237,172	16,165	.....
Apr.	94,362	85,471	5,462	72,291
May	85,223	76,912	4,855	66,926
June	84,656	76,333	4,706	64,535
July	71,041	64,451	3,926	61,209
Aug.	78,357	70,557	4,890	63,419
Sept.	80,307	71,895	5,273	59,141
Oct.	83,661	74,221	5,775	53,867
Nov.	74,712	66,300	5,077	49,481
Dec.	77,669	68,814	5,082	47,922
Total	993,750	892,126	61,211	.....
1954				
Jan.	71,437	63,034	4,618	42,351
Feb.	68,849	60,913	4,743	21,943
Mar.	76,354	67,826	5,123	38,417
3 mo.	216,640	191,773	14,484	.....

ALUMINUM

(Shipments of castings—1000 pounds)

	Shipments—Total	Shipments—Sand	Shipments—Perm. Mold	Shipments—Die	Unfilled Orders[2]
1952[3]	518,979	194,616	146,883	169,732	.....
1953[3]					
Mar.	59,423	18,989	17,865	22,255	145,749
3 mo.	169,916	55,730	50,710	62,579	.....
Apr.	61,582	20,009	18,583	22,620	141,231
May	57,602	19,600	16,479	21,208	138,037
June	56,820	19,330	15,535	21,675	136,437
July	51,653	16,664	15,733	18,915	126,426
Aug.	50,900	16,007	16,294	18,200	127,896
Sept.	53,694	17,818	17,215	18,245	122,049
Oct.	55,438	17,212	16,983	20,893	116,744
Nov.	51,405	16,209	15,349	19,409	108,698
Dec.	52,025	15,375	16,852	19,363	107,754
Total	661,035	213,954	199,733	243,107	.....
1954					
Jan.	51,446	14,698	16,615	19,709	103,318
Feb.	51,213	14,696	17,281	18,754	96,011
Mar.	56,151	14,468	19,576	21,612	93,386
3 mo.	158,810	43,862	53,472	60,075	.....

MAGNESIUM

(Shipments of castings—1000 pounds[1])

	Shipments—Total	Shipments—For Sale	Unfilled Orders[2]
1952[3]	34,857	32,977	.....
1953[3]			
Mar.	3,362	3,093	13,608
3 mo.	9,660	8,951	.....
Apr.	3,294	3,046	12,709
May	2,679	2,434	13,635
June	3,136	2,666	13,664
July	2,372	2,084	13,840
Aug.	2,559	2,279	13,125
Sept.	2,524	2,236	12,454
Oct.	3,015	2,708	11,477
Nov.	2,677	2,413	10,619
Dec.	2,685	2,427	9,324
Total	34,601	31,244	.....
1954			
Jan.	2,451	2,1[illegible]9	8,800
Feb.	2,194	1,945	8,315
Mar.	2,407	2,1[illegible]9	7,698
3 mo.	7,052	6,203	.....

PRODUCTION WORKERS

Estimated Number

(Thousands)

	Feb. 1954	Jan. 1954	Feb. 1953
Ferrous	188,200	190,600	224,200
Nonferrous	66,900	69,100	82,900

Average Weekly Earnings

Gray Iron	$71.42	$73.51	$74.34
Malleable Iron	69.92	72.77	77.46
Steel	77.62	76.43	80.12
Nonferrous	80.60	80.40	82.10

Average Weekly Hours

Gray Iron	38.4	39.1	40.4
Malleable Iron	36.8	38.1	41.2
Steel	39.2	38.6	41.3
Nonferrous	40.1	40.0	42.1

Labor Turnover Rate (Feb.)

(Per 100 employees)

	Total Accession	Total Separation	Quit	Layoff
Gray Iron	2.5	2.9	0.7	1.7
Malleable Iron	3.5	2.5	0.9	1.1
Steel	2.6	2.9	0.6	2.0
Nonferrous	2.5	6.2	0.7	5.0

Source: Bureau of Labor Statistics

GRAY IRON CASTINGS—SHIPMENTS

(Net tons[1])

	All Castings—Total	All Castings—For Sale	Miscellaneous Castings—Total	Miscellaneous Castings—For Sale	Heavy Steel Ingot Molds—Total	Heavy Steel Ingot Molds—For Sale	Chilled Railroad Car Wheels—Total	Pressure Pipe & Fittings—Total[4]	Soil Pipe & Fittings—Total[4]	Unfilled Orders[2]
1952	12,862,494	7,373,757	8,095,299	3,794,164	2,238,309	1,070,252	544,896	1,312,518	651,472	.....
1953										
Mar.	1,264,271	674,720	800,390	341,656	250,447	119,630	41,414	114,885	57,135	1,375,886
3 mo.	3,562,084	1,904,272	2,252,453	981,087	730,988	344,542	134,219	301,967	152,457	.....
Apr.	1,277,288	683,047	799,872	329,802	246,873	122,702	44,877	120,105	65,561	1,305,849
May	1,185,545	641,581	734,326	312,836	238,202	115,728	41,373	113,136	58,508	1,271,711
June	1,196,106	648,400	743,737	312,681	232,596	115,946	45,542	114,118	60,113	1,245,904
July	1,056,422	573,280	652,371	274,890	212,187	106,526	36,715	97,739	57,410	1,232,651
Aug.	1,069,392	588,543	646,902	286,449	217,930	107,428	40,327	107,805	56,428	1,222,612
Sept.	1,105,582	611,905	669,225	289,909	232,055	117,694	37,055	108,270	58,977	1,170,191
Oct.	1,141,526	650,229	669,757	300,249	245,966	124,177	41,917	118,306	65,580	1,075,538
Nov.	1,004,326	563,930	589,657	266,039	227,800	111,022	31,373	101,576	53,920	977,012
Dec.	1,032,444	552,565	634,250	274,203	228,532	108,700	30,051	94,053	45,558	954,885
Total	13,630,715	7,417,752	8,392,550	3,537,645	2,813,129	1,374,465	473,449	1,277,075	674,512	.....
1954										
Jan.	932,298	488,497	607,755	261,164	154,359	60,947	31,316	90,898	47,970	871,918
Feb.	936,364	491,983	607,085	252,591	156,933	70,261	29,240	92,546	50,560	865,344
Mar.	1,048,099	553,358	685,692	223,328	153,336	65,590	34,236	113,016	61,885	842,499
3 mo.	2,916,761	1,533,838	1,900,532	736,083	464,628	196,798	94,972	296,460	160,415	.....

STEEL CASTINGS—SHIPMENTS

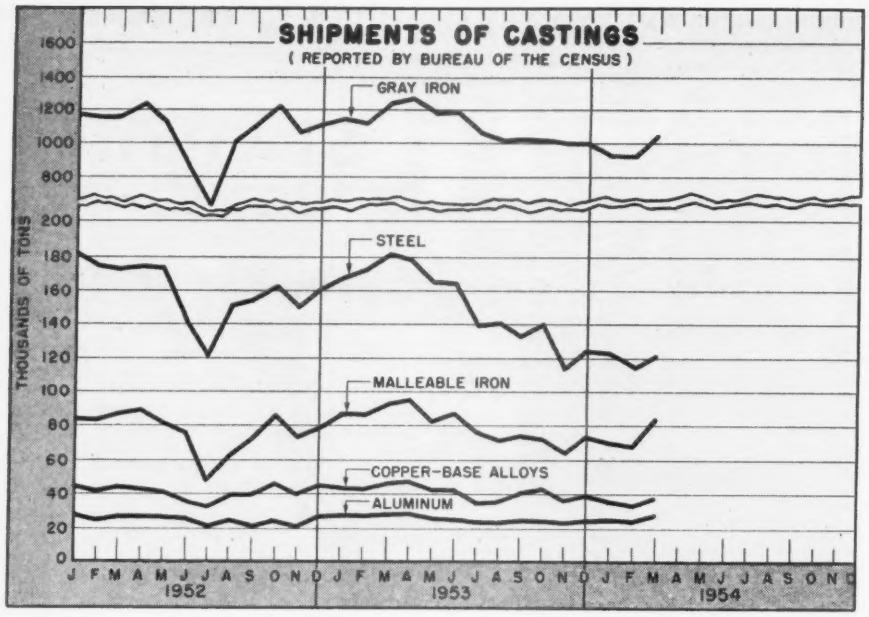
(Net tons[1])

	All Castings—Total	All Castings—For Sale	All Castings—Railway Specialties	Carbon Steel—Total	Carbon Steel—For Sale	Carbon Steel—Railway Specialties	Alloy Steel—Total	Alloy Steel—For Sale	Alloy Steel—Railway Specialties	Unfilled Orders[3]
1952	1,925,707	1,476,746	342,561	1,496,450	1,053,264	298,948	553,403	430,493	40,613	.....
1953										
Mar.	182,181	141,873	34,364	129,055	100,069	31,772	53,126	42,286	2,592	634,600
3 mo.	525,067	406,284	94,670	370,102	284,110	86,388	154,975	123,902	8,282	.....
Apr.	179,615	140,051	34,035	128,457	99,602	31,212	51,158	40,938	2,823	573,565
May	165,649	126,380	29,552	117,318	88,781	26,888	48,331	38,036	2,664	328,931
June	164,665	125,984	30,381	116,358	88,260	27,767	48,307	38,130	2,614	475,756
July	139,577	105,687	22,925	95,891	71,488	20,938	43,686	34,532	1,987	467,900
Aug.	141,340	107,941	25,026	97,076	73,784	22,637	44,264	35,003	2,389	418,927
Sept.	135,303	102,880	24,108	95,944	72,780	21,724	39,359	30,338	2,384	327,172
Oct.	140,702	106,788	25,354	100,568	76,118	23,449	40,134	30,988	1,905	313,684
Nov.	114,088	84,945	17,784	79,989	57,947	16,233	34,099	27,167	1,551	308,526
Dec.	123,281	91,017	18,685	86,465	62,377	16,998	36,674	29,952	1,687	278,389
Total	1,829,287	1,397,957	322,520	1,288,168	975,247	294,234	540,977	428,986	28,286	.....
1954										
Jan.	122,758	93,577	20,197	83,927	62,749	18,407	38,831	30,828	1,790	251,847
Feb.	116,520	88,699	17,938	81,433	60,638	15,961	35,087	28,061	1,967	234,634
Mar.	122,310	92,271	15,684	85,211	62,955	14,190	37,099	29,316	1,494	214,372
3 mo.	361,588	274,547	53,819	250,571	186,342	48,558	111,017	88,205	5,251	.....

[1] Source: Bureau of Census. [2] For sale only. [3] Based on new sampling method; not comparable to prior figures.
[4] All cast iron pipe is shipped for sale.

(Concluded on page 158)

FOUNDRY STATISTICS (Concluded from page 157)



INDEX OF FOUNDRY EQUIPMENT ORDERS

Foundry Trades Only
(Net Orders Closed, New Equipment)

	1953	1954
Jan.	99.6	173.8
Feb.	97.5	99.9
Mar.	132.2	82.7
Apr.	111.8	125.3
May	182.1	....
June	156.4	....
July	158.9	....
Aug.	235.5	....
Sept.	127.7	....
Oct.	87.1	....
Nov.	149.4	....
Dec.	160.8	....

Note: Figures are precentages of the base period 1947-49 taken as 100 per cent (monthly average). This is a new base period. Source: Foundry Equipment Manufacturers Association.

COKE PRODUCTION & CONSUMPTION

(Net tons)

	Production	Consumption Total	Consumption By Foundries
1952	68,254,109	67,865,639	3,102,446
1953			
Mar.	6,842,488	6,880,579	275,442
3 mo.	19,746,057	20,032,085	762,007
Apr.	6,543,601	6,541,307	271,955
May	6,824,810	6,752,823	272,673
June	6,625,223	6,692,864	254,830
July	6,748,229	6,654,080	217,504
Aug.	6,719,941	6,587,005	236,738
Sept.	6,404,143	6,330,441	236,119
Oct.	6,554,638	6,555,613	236,329
Nov.	6,208,155	6,039,813	216,837
Dec.	6,093,009	6,041,383	210,388
Total	78,467,806	78,227,414	2,915,420
1954			
Jan	5,812,426	5,639,117	224,298
Feb.	4,889,717	4,920,651	211,114
Mar.	5,146,489	5,177,715	228,127
3 mo.	15,848,632	15,737,483	663,539

INGOT BRASS & BRONZE

(Shipments in net tons)

	1953	1954
Jan.	24,423	20,661
Feb.	25,429	19,920
Mar.	28,256	23,653
Apr.	25,044	24,746
May	21,660	.....
June	20,818	.....
July	19,321	.....
Aug.	20,156	.....
Sept.	21,463	.....
Oct.	22,280	.....
Nov.	21,860	.....
Dec.	20,541	.....
Total for year	271,251	.....

ZINC-BASE ALLOY

(Shipments of castings—1000 pounds[1])

	Shipments—Totals	Shipments—For Sale	Unfilled Orders[2]
1952[3]	408,353	282,673	.....
1953[3]			
Mar.	51,673	35,460	90,266
3 mo.	144,197	97,923	.....
Apr.	51,456	34,674	91,874
May	44,471	29,403	85,234
June	49,051	31,255	88,060
Total	523,892	341,963	.....
1954			
Jan.	40,396	27,257	61,754
Feb.	37,660	24,112	55,351
Mar.	42,973	28,810	52,518
3 mo.	121,029	80,179	.....

PIG IRON PRODUCTION AND CONSUMPTION

	Production** (Standard grades—net tons)					Consumption* (By type of furnace—gross tons)			
	Total	Foundry	Malleable	Basic	Low Phos. Intermediate Low Phos. & Bessemer	Total	Cupola	Air	Electric
1952	61,306,723	2,864,722	3,013,267	48,253,390	7,175,344	61,550,961	5,438,294	449,646	118,820
1953									
Mar.	6,601,113	263,890	358,109	5,526,146	722,968	5,872,700	465,913	27,338	13,693
3 mo.	18,874,332	725,730	938,236	15,368,336	2,112,038	16,863,984	1,308,768	75,444	39,245
Apr.	6,161,640	244,671	327,095	4,885,642	704,232	5,567,515	477,929	28,212	11,675
May	6,508,487	210,021	347,666	5,236,990	713,810	5,844,427	436,343	24,366	13,877
June	6,288,049	201,646	313,404	5,075,028	697,971	5,581,403	436,927	24,332	12,145
July	6,425,855	213,469	344,377	5,145,135	722,874	5,579,692	367,081	19,880	15,471
Aug.	6,381,056	202,116	310,717	5,167,059	701,164	5,672,037	385,003	20,829	14,206
Sept.	6,121,399	209,444	310,441	4,926,986	674,528	5,378,517	393,292	21,775	16,039
Oct.	6,409,245	218,880	290,882	5,175,064	724,479	5,733,466	395,066	21,349	13,206
Nov.	5,995,511	201,047	277,181	4,859,252	658,031	5,324,537	343,233	17,528	15,842
Dec.	5,712,937	172,283	276,432	4,625,524	638,698	5,091,786	374,838	18,596	12,561
Total	74,878,511	2,599,307	3,736,431	60,465,016	8,347,817	66,637,364	4,918,480	272,311	164,267
1954									
Jan.	5,531,137	184,629	294,691	4,510,870	540,947	4,933,282	362,576	17,620	14,578
Feb.	4,764,613	156,178	272,707	3,911,670	424,058	4,293,942	351,824	17,257	9,892
Mar.	4,907,147	213,249	243,356	3,977,137	473,405	.....	.....	.....	.....
3 mo.	15,202,897	554,056	810,754	12,399,677	1,438,410	.....	.....	.....	.....

IRON AND STEEL SCRAP CONSUMPTION

(Gross tons*)

	All Scrap		By Types of Furnace					
			Cupola		Air		Electric	
	Total	Purchased	Total	Purchased	Total	Purchased	Total	Purchased
1952	61,625,549	30,520,946	9,154,146	4,752,497	1,053,233	395,591	8,015,064	5,190,833
1953								
Feb.	5,802,854	2,817,896	818,375	422,306	92,371	35,234	745,179	478,486
2 mo.	12,059,572	5,879,447	1,628,629	836,277	187,801	70,929	1,540,471	996,449
Mar.	6,536,867	3,211,476	901,786	464,110	103,034	38,583	857,760	563,489
Apr.	6,227,089	3,026,533	921,589	474,185	106,449	41,004	820,647	531,509
May	6,294,920	3,105,598	861,404	450,477	92,703	35,566	798,098	523,606
June	5,951,170	2,835,875	876,320	454,905	99,799	38,934	743,530	468,129
July	5,539,468	2,597,365	729,114	369,283	74,815	26,755	691,521	443,263
Aug.	5,637,759	2,614,153	753,272	390,741	77,047	28,167	678,968	428,332
Sept.	5,395,721	2,393,773	782,131	405,274	80,866	29,032	595,523	363,706
Oct.	5,628,568	.....	779,444	.....	75,618	.....	566,878	.....
Nov.	5,064,565	.....	687,498	.....	60,200	.....	477,666	.....
Dec.	4,690,277	.....	755,276	.....	68,002	.....	442,818	.....
Total	69,005,976	.....	9,676,463	.....	1,026,334	.....	8,263,880	.....
1954								
Jan.	4,574,384	.....	711,335	.....	71,202	.....	505,536	.....
Feb.	4,385,340	.....	704,535	.....	67,263	.....	462,095	.....
2 mo.	8,959,724	.....	1,415,870	.....	138,465	.....	967,631	.....

*Source: U. S. Dept. of Interior. Bureau of Mines. **Source: American Iron & Steel Institute. [1]Source: Bureau of the Census [2]For sale only. [3]Based on new sampling method; not comparable to prior figures.

Another foundry proves that
it pays to "weigh" air!

At Parker-Street Foundry, Cleveland, Ohio, operator merely sets pointer on this Foxboro Air-Weight Controller (left) before start of run. Combustion is controlled automatically and continuously, pours are more uniform, and scrap losses are greatly reduced.

Another foundry has discovered the practical, automatic way to keep castings uniform . . . through Foxboro Air-Weight Control of cupola blast. An official of this mid-west foundry says: *"We can say that, after a year of operation, we find our melting much more uniform than before — even under adverse weather conditions. We get uniformly higher temperatures, regardless of day-to-day scrap variables."*

This is typical of reports from more than 1000 other foundries using Foxboro Air-Weight Control . . . product quality improved . . . rejects reduced . . . fuel saved . . . pigging practically eliminated. It's logical. In the Foxboro System a controller "weighs" air for cupola blast . . . compensates for atmospheric changes. Coke charge always gets correct amount of oxygen for best combustion . . . heating is faster, more uniform.

Investigate the advantages of Foxboro Air-Weight Control for *your* plant. Get in touch with a Foxboro Field Engineer, or write, for complete details.

FACTORIES IN THE UNITED STATES, CANADA, AND ENGLAND

FOXBORO
REG. U. S. PAT. OFF.

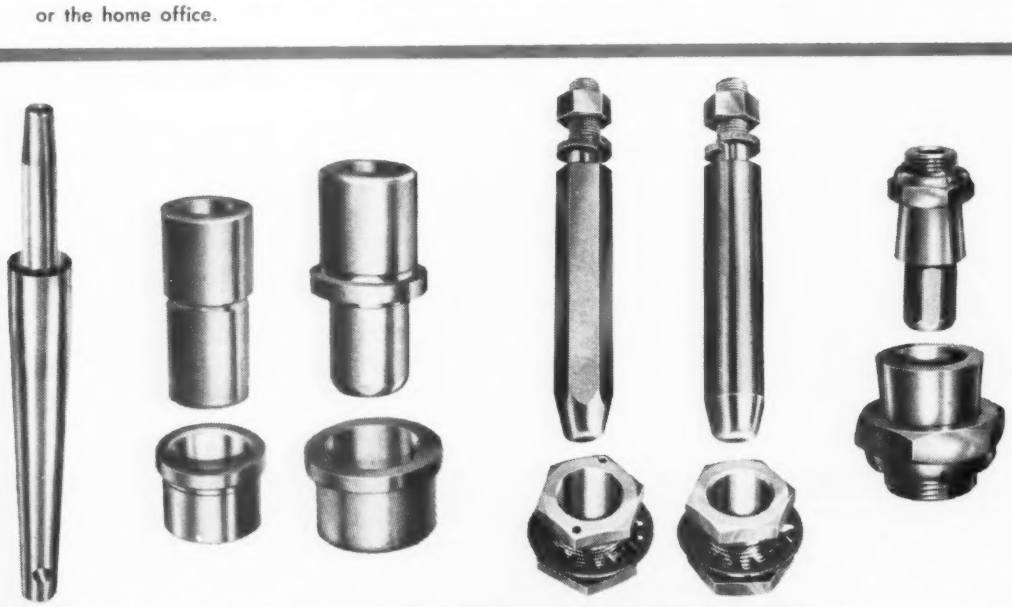
AIR-WEIGHT CONTROLLERS

THE FOXBORO COMPANY, 327 NEPONSET AVE., FOXBORO, MASS., U. S. A.

QUICK CHANGE WITH UNIVERSAL STANDARD PRESS-FIT FLASK PINS AND BUSHINGS

To compensate for wear in the ear holes of cope and drag, standard size Universal Press-Fit Flask Pins and Bushings are available with three different outside diameters, the second slightly larger than the original size and the third slightly larger than the second. Thus, as the ear holes increase in size—and replacement of the original pins and bushings becomes necessary—pins and bushings with a larger outside diameter are available to provide a good, tight fit in the larger ear holes without welding or other expensive, time-consuming operations. Just drive out the old, press in the new . . . truly "quick change"!

Universal Flask Pins and Bushings of all types are available in a complete range of sizes as regular stock items. Plain, taper, threaded or hexagonal series. For complete information, write to Universal Engineering Sales Co., 1060 Broad St., Newark 2, N. J.; 5035 Sixth Ave., Kenosha, Wis.; or the home office.



186

UNIVERSAL ENGINEERING COMPANY FRANKENMUTH 4, MICHIGAN

(*Continued from page* 154)
changed for differences in sulphur removal. Mr. Crockett replied that if the injection tube is preheated and the flow of nitrogen begun before immersion, no trouble should occur. Since injection of cold carbide causes a temperature drop, it is necessary to have hot iron at the start. Graphite tubes 1 in. OD with a $\frac{7}{16}$-in. bore serve satisfactorily.

Final paper, **Alloying and Heat Treating Spherulitic Graphite Cast Iron,** by C. C. Reynolds and H. F. Taylor, Massachusetts Institute of Technology, Cambridge, Mass., was presented by Mr. Reynolds. Pointing out that alloys are added to change the structure of gray irons, and heat treatment employed to improve their properties, the same applies to spherulitic cast irons. He then described effect of various alloys and heat treatments on the irons.

Concluding gray iron session essentially was concerned with carbon. In discussing **Effect of Graphite Flake Size Upon the Tensile and Fatigue Properties of Gray Cast Iron,** by R. W. Lindsay, Pennsylvania State University, State College, Pa., and J. H. Hoke, Johns Hopkins University, Baltimore, Mr. Lindsay described a procedure whereby the matrix structure was held constant, and only the graphite flake size varied. Examination and physical testing of various specimens showed that tensile strength decreased about 25 per cent and endurance limit was lowered around 35 per cent when the graphite flake size was increased from size 5 to size 3, AFS graphite classification.

Also a definite decrease in the apparent modulus of elasticity in tension was observed. In reply to the question of whether the effect of structure had been adjusted by heat treatment, it was pointed out that it had as revealed by study of micrographs.

W. C. Jeffery, University of Alabama, University, Ala., in a paper, **Relationship of the Carbon Equivalent to the Properties of Cast Iron,** prepared in co-operation with E. E. Langner Jr., W. G. Mitchell and G. D. Azizi, desecribed tests upon a number of unalloyed gray irons prepared from pig irons and ingot iron and melted in an indirect arc furnace to provide phosphorus contents from 0.25 to 0.80 per cent and carbon equivalents from 2.9 to 4.9, based on TC plus 0.3 (Si plus P).

In those irons as the CE increases from 2.9 the tensile strength gradually decreases, and chill decreases until at a CE of 4.4 no chill exists. Fluidity appears to be at a maximum at a CE of 4.5, increasing from low CE up to that value and then decreasing. Using a drill test as a machinability index, it was found that machinability increased as CE increased. Machinability with higher phosphorus irons was somewhat less than with lower phosphorus irons. Increasing phosphorus increased coarseness of pearlite.

Internal shrinkage was observed by casting 4-in. cubes. As phosphorus increased from 0.2 to 0.7 per cent shrinkage increased, but CE effect was far greater; low CE values showed higher shrink. In the discussion T. E. Eagan, Cooper-Bessemer Corp., Grove City, Pa., pointed out that study of shrinkage should be carried on with castings rather than cubes since conditions are not the same, and the foundryman is vitally interested in what occurs in the castings.

Graphitization of Certain Fe-C-Ti Alloys, by A. B. Beach and R. W. Heine, University of Wisconsin, Madison, Wis., was the concluding paper on the program and was presented by P. C. Rosenthal, also of the university. This reported a study of six ternary iron alloys containing about 2.50 per cent carbon and 0 to 3.0 per cent titanium, and indicated that Ti promoted equilibrium structures wherein graphite, ferrite and titanium carbide were the phases present after heat treatment. Alloying behavior of titanium in being entirely a former of titanium carbide, shows that it is not necessary for an element to dissolve in ferrite in order to promote graphitization of iron carbide in ternary iron-carbon alloys. Since the titanium is tied up as a carbide in the graphitizable alloys, no hardening or strengthening effects on the ferrite can be expected.

GRAY IRON SHOP COURSE

THREE shop course sessions were included in the gray iron program. Discussions at these sessions covered coke screening, gating and cupola bed practice.

Discussion leader at the first session was W. W. Holden, Eaton Mfg. Co., Vassar, Mich., who opened proceedings with a paper entitled **Coke Screening and Its Relation to Cupola Operation.** Mr. Holden described how the iron-coke ratio at Eaton has been raised from 6.7 to 1 in 1948 to nearly 10 to 1 now, and he ascribed this drop in coke consumption almost entirely to a coke screening installation. He stressed that no one size of coke necessarily is suitable for a given cupola operation, but that uniform size is important. The proper size should be worked out for any particular installation.

The discussion period produced both agreement and disagreement with Mr. Holden's points. On the negative side it was stated that large coke is too hard to burn and that some small coke can help to raise temperatures as long as the passage of air through it is maintained. Affirmatively, it was said that screening is necessary and that ordering coke at a given size is not enough to insure good melting.

Mr. Holden also pointed out during the discussion that weighing coke and employing a sufficiently large blower are vital to proper cupola practice.

Second of the gray iron shop courses dealt with **Gating To Control Pouring Rate and Its Effect on Casting Quality,** and discussion leader was F. J. McDonald, Central Foundry Division, General Motors Corp., Saginaw, Mich. According to the speaker, study of gating systems shows that shape of the sprue cup, cross-sectional area of the downsprue, use of skim cores, and cross-sectional area of the runner have an effect on obtaining clean sound castings with desired dimensional tolerances. Reducing width of shoulder at bottom of sprue cup or decreasing slope of sidewalls increases pouring rate.

Down sprues too small tend to cause misruns, while if too large may result in rough surface and strains in the castings. It was found that if the metal velocity is 0.75 ft per second in 5 in. of runner length, slag defects are eliminated without use of skim cores. Constant pouring height is advisable, and in tests conducted, a height of 12 in. gave the highest pouring rate. By adjustment of downsprue size and choking the runner it is possible to eliminate use of skim cores, and save materials and labor.

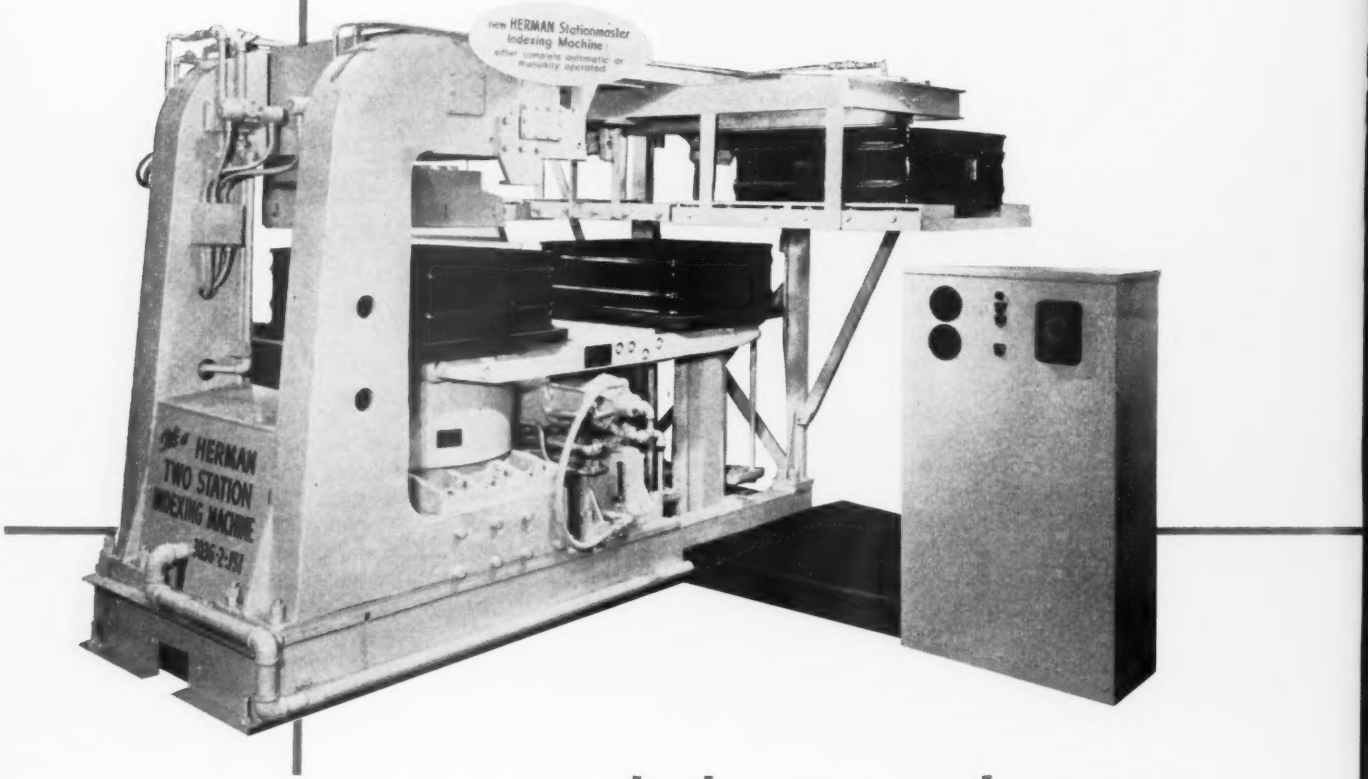
At the third and final gray iron shop course, D. E. Matthieu, Alabama Pipe Co., Anniston, Ala., discussed **Cupola Bed Practice** and emphasized that poor cupola practice destroys

(*Continued on page* 164)

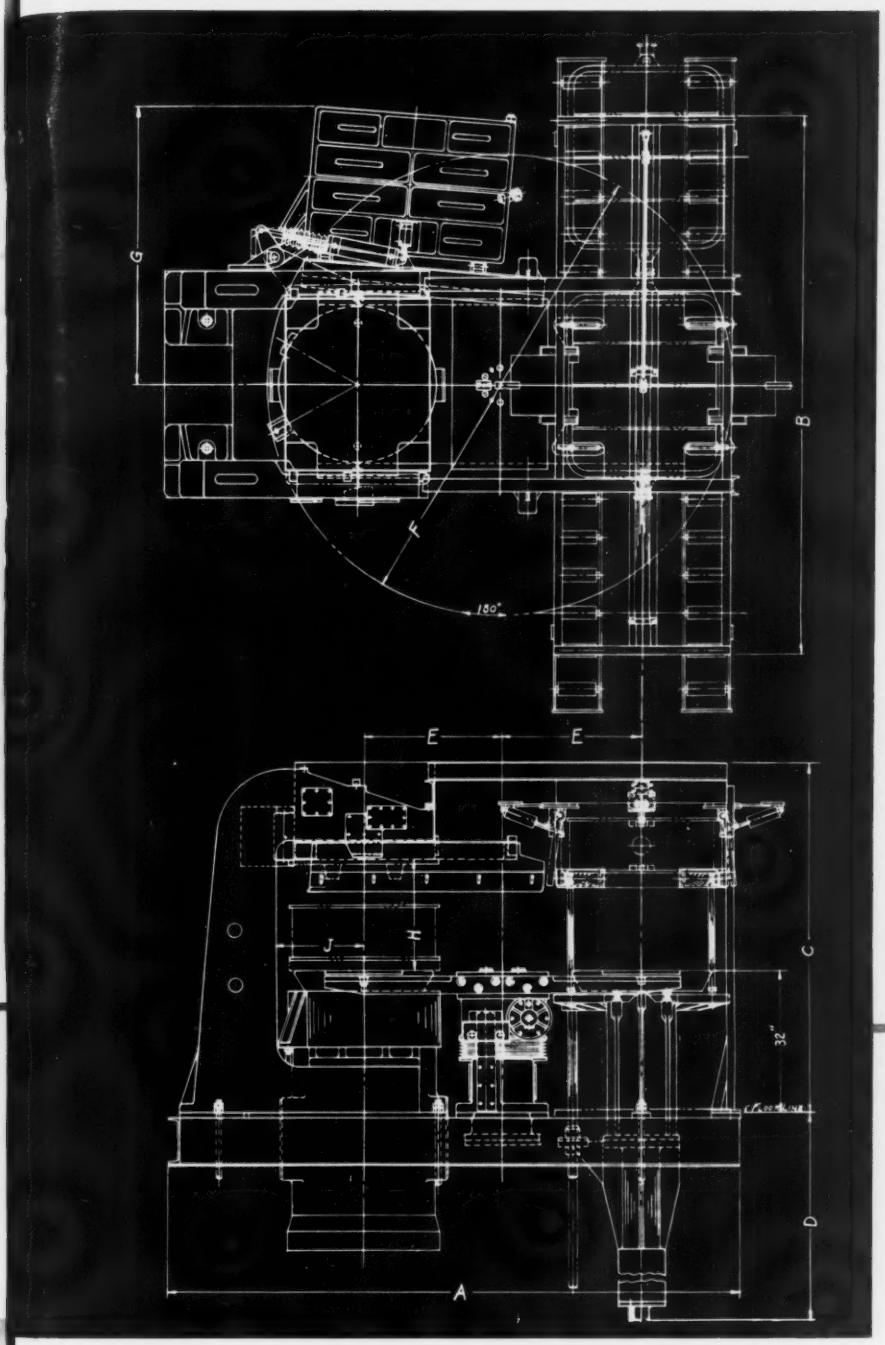
YOU SAW IT AT THE A. F. S. SHOW!

HERMAN stationmaster

OUR NEW TWO-STATION INDEXING TYPE JOLT, SQUEEZE, STRIP MACHINE



MODEL NUMBER OF MACHINE		3036-2-JSI	4248-2-JSI
Nominal Flask Size Range (Width)		20" Min. — 30" Max.	30" Min. — 42" Max.
Nominal Flask Size Range (Length)		24" Min. — 36" Max.	36" Min. — 48" Max.
Jolt Load Max. @ 80# Pressure		2500#	5000#
Jolt Cylinder Diameter		8½"	13"
Squeeze Cylinder Diameter		28"	36"
Squeeze Capacity @ 80# Pressure		49,000#	80,000#
Squeeze Piston Stroke		10"	14"
Maximum Pattern Draw		18"	23"
Strip Pin Centers (Width)		19" Min. — 35" Max.	29" Min. — 48" Max.
Strip Pin Centers (Length)		26"	38"
Floor to Pattern Carrier Plate		32"	32"
Overall Length	A	10'-4"	13'-3"
Overall Width	B	9'-6"	11'-6"
Overall Height from Floor	C	6'-5"	7'-7"
Depth Below Floor	D	4'-6"	5'-10"
Center Line Index to Center Line Squeeze or Strip	E	30"	38"
Sweep Clearance Diameter of Turret	F	8'-3"	11'-0"
Center Line Squeeze to Platen Withdrawn	G	5'-0"	7'-0"
Pattern Plate to Squeeze Platen	H	24"	36"
Center Jolt and Squeeze to Back Housing	J	19"	28"



FEATURES:

1. Proper jolt insured by adjustable Bunter Control Valve and Timing Device.
2. Squeeze pressures adjustable to a maximum.
3. Adjustable strike-off bar.
4. Retractable squeeze head permits direct sand filling through variable sand hoppers mounted on squeeze head support.
5. Squeeze piston provided with limit stop.
6. Adequate registrations insure accurate location of flask at all positions.
7. Jolting, squeezing pneumatically operated.
8. Other operations controlled by proven pneumatic hydraulic application to insure fast, smooth, positive action.

Machines may be controlled automatically, semi-automatically or manually. Simultaneous operations are performed at each of the two stations of this indexing machine, resulting in a faster cycle and higher production.

The Herman Stationmaster is one of a complete line of Herman Molding Machines, in all types and sizes, to fit all foundry operations.

Write for our new catalog No. JSI-2-54.

MEMBER FEMA

Herman **MOLDING MACHINES**

HERMAN PNEUMATIC MACHINE CO., UNION BANK BUILDING, PITTSBURGH 22, PA.

BIG
SAVINGS
IN PATTERN
SHOP TIME
AND LABOR
with
SCIENTIFIC
Pressure Cast
MATCH PLATES
YOU NEED NO MORE THAN ONE MASTER PATTERN

• FROM IT WE MAKE PRECISION MULTIPLE DUPLICATES IN ONE COMPACT MOLD.

Cast of aluminum, the plates are poured under pressure to assure filling all detail. Molding is done in plaster only, for extreme accuracy.

Expensive duplicate master patterns and high cleaning costs are eliminated.

WRITE FOR BULLETIN NO. 52

The SCIENTIFIC
CAST PRODUCTS *Corp.*

1390 East 40th Street
CLEVELAND 3, OHIO

2520 West Lake Street
CHICAGO 12, ILLINOIS

(*Continued from page* 161)

the effectiveness of an entire operation, regardless of all else. Bed coke should be hand picked, he stated, and he went on to point out that the correct coke size is one that will burn and produce CO_2 at the top of the coke bed.

The bed must be evenly and wholly burned, without hot spots. It should be burned to a bright, cherry red, after which 6 to 8 in. of green coke should be added. Bed height, which usually must be determined by experimentation, should be measured and is much more important than weighing. At the proper bed height, metal flow is adequate. During trials to determine correct height, the bed should be varied 4 to 6 in. at a time while no other factors are changed. Once the optimum height has been determined, it must be maintained, or cold metal will result, usually as a result of an imbalance of bed height and air. Refractory burnouts are an indication of what is wrong with fuel performance.

Symptoms which warn of poor bed performance should be watched for before serious harm is done. These symptoms include: 1. Rise in temperature followed by a gradual drop. 2. Change in slag color from the normal grayish green to black or cream. Black means bed height is low, and cream indicates too much flux. Brown smoke means oxidizing is occurring. Gas analysis also is significant. 3. Excessive silicon and manganese loss.

All of these require immediate action to correct them. First step is to adjust air input, then to alter coke volume as necessary.

Mr. Matthieu stressed strongly the need for trained, conscientious, intelligent cupola operators.

SAND SHOP COURSE

Fundamentals of Sand Control was the subject under fire at three sand shop course sessions. Approximately 200 persons met at the first session to hear a panel composed of D. L. LaVelle, American Smelting & Refining Co., South Plainfield, N. J., W. M. Ball Jr., R. Lavin & Sons, Chicago, and Eric Welander, John Deere Malleable Works, East Moline, Ill.

A wide range of subject matter was discussed with general agreement being reached on the following: The term "synthetic sands" is a misnomer; "formulated sands" would more accurately describe sand mixtures processed to meet special requirements. There seems to be a trend toward increased use of formulated sands in nonferrous practice although it was pointed out that prop-

FREEDOMS FOUNDATION has named Bohn Aluminum & Brass Corp., Detroit its top award winner in the advertising category for the 1953 campaign. A gold medal was presented to Bohn's president, S. D. Den Uyl, center, at Valley Forge, Pa., by Dr. Milton Eisenhower, president of Penn State College. At right is Dr. Kenneth D. Wells, Freedoms Foundation president

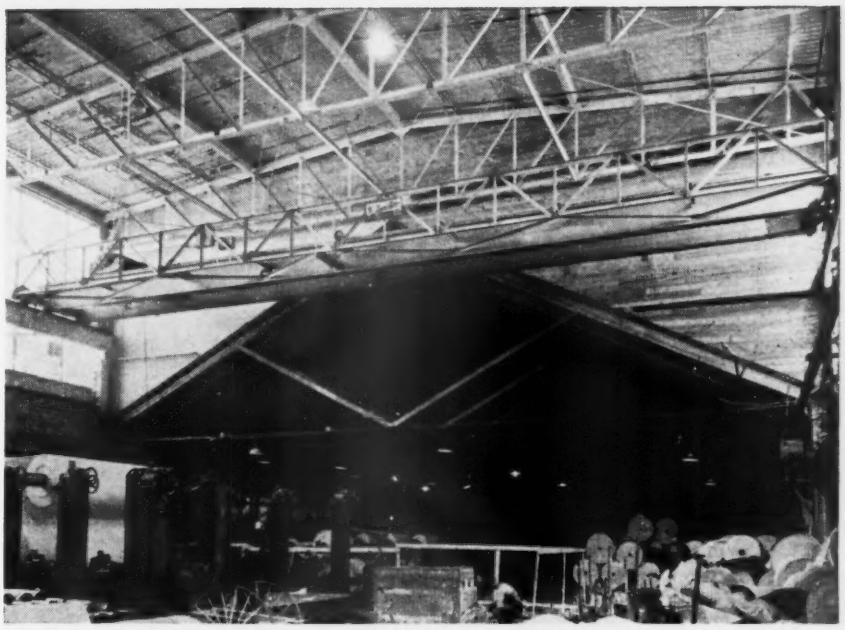
erly produced and controlled natural bonded sands are still playing a major role in the production of fine castings. All metals can be cast in formulated sands—different mixtures for different metals, of course. The quick drying characteristics of the formulated sands are detrimental, but can be tolerated in view of the fine castings generally produced.

The importance of moisture was discussed at some length because of its effect upon molding and casting quality. Moisture will vary from plant to plant but equipment is available that will test moisture content and allow for control within 0.1 per cent before the sand comes from the muller. All moisture will disappear from sand at 2200° F, and constant application of calcium chloride will keep moisture out. High water content is tolerable if high permeability is present. High magnesium alloys react on the surface to high water content.

Good malleable practice indicates it is best to pour at as low a temperature as experience proves is practical to provide a sound casting; it isn't necessary to be seeking higher pouring temperatures. Since sand expands when heated and clay contracts when heated, it is essential that the sand and clay components be kept in balance. An underbaked core will cause blows and an overbaked core will fall apart. As a rule of thumb, a core of light brown chestnut color will generally have the qualities of a good sound core. Dry compression strength is more important as a control check than hot compression strength.

With F. S. Brewster, Harry W. Dietert Co., Detroit, presiding, a panel of experts answered carefully

"How do you like your SANDwich, Perkley?"



SERIES "D" 'Load Lifter'® CRANES

...a new standard in crane value and performance

Series "D" All-Electric 'Load-Lifter' Cranes are today's most advanced cranes for average industrial needs. Standardization and mass production techniques make them available at prices far lower than other cranes designed for similar use. All types and capacities have performance-proved features like those in all "Shaw-Box" Cranes for the severest heavy-duty service.

Dependability and economy are inseparable in Series "D" 'Load Lifter' Cranes. Rigid *three-girder* construction prevents whipping and skewing. The motor and drive shaft are permanently aligned. Every bearing is a ball or roller bearing. The bridge and trolley wheel axles rotate on ball bearings, equally loaded, on each side of each wheel. All gearing operates in oil in sealed housings. Variable-speed magnetic controllers make spotting easy and accurate. Low maintenance, economical operation and complete safety for man, load and crane are assured.

Series "D" All-Electric 'Load Lifter' Cranes are built in capacities from 1 to 20 tons. Three basic types and three trolley styles are available. Pendant-type push-button control is standard on floor-operated cranes. Cage-controlled types are equipped with master switches. Selection is easy. Write for Catalog 221 and make your choice.

'Load Lifter'® CRANES

MANNING, MAXWELL & MOORE, INC. Muskegon, Michigan

Builders of "Shaw-Box" and 'Load Lifter' Cranes, 'Budgit' and 'Load Lifter' Hoists and other lifting specialties. Makers of 'Ashcroft' Gauges, 'Hancock' Valves, 'Consolidated' Safety and Relief Valves, 'American' and 'American-Microsen' Industrial Instruments, and Aircraft Products.

prepared questions regarding sand control, together with other questions from the floor during the second session.

Panel Members W. R. Jennings, John Deere Tractor Co., Waterloo, Iowa; L. E. Wile, Lynchburg Foundry Co., Lynchburg, Va., and J. W. Clarke, General Electric Co., Erie, Pa., not only answered the questions ably and completely but each shared with the audience, found conclusions reached after years of practical experience.

Subjects covered included fundamentals of sand selection, preparation and control, including trouble shooting; maintenance of equipment and personnel supervision.

The third sand shop course session was confined to sand control fundamentals pertaining to steel practice. About 75 persons attended the session to hear E. C. Troy, Palmyra, N. Y., and C. H. Wyman, Burnside Steel Foundry Co., Chicago.

For use in the manufacture of steel castings, natural bonded sands do not contain all of the desired properties, hence the need for the formulation of special mixtures. The use of silica flour was the subject of lengthy discussion and it was agreed that in many instances the use of a basic sand plus silica flour in varying percentages and the incorporation of other additives can be a valuable tool. Reasons for adding silica flour are these: It helps maintain a definite permeability range, builds hot strength, helps reduce erosion, increases dry and hot compression strength, helps prevent metal penetration, and is inexpensive.

Corn flour and other cereals are used in sand mixtures because they have a minimum effect on permeability, aid workability and flowability, make for an easier draw, add green strength, and aid hot and dry compression.

There appears to be no accepted, industry-wide, all-purpose core sand mixture. Conditions vary from plant to plant, and most casting jobs are problems in themselves requiring special sand treatment. However, if moisture and grain distribution can be controlled properly, and fines kept out, an all-purpose mixture can be approached.

Steel foundries prefer to use a sand mulled to a full or nearly full mulling cycle. It was pointed out that the smaller the amount of bentonite added the shorter the mulling period and the better the flowability. When sand is brittle, deformation increases. Low deformation results from inadequate mulling.

MALLEABLE SHOP COURSE

MELTING and annealing practices were discussed at the two sessions comprising the malleable iron shop course.

First session focused attention on **Melting of Malleable Iron** and three papers elaborated upon some phase of this topic. First speaker, R. W. Heine, University of Wisconsin, Madison, Wis., confined his attention to **Cupola Melting Fundamentals.** Among points which he discussed were combustion control principles, melting rates, coke ratios, coke combustion rates, etc.

Not only does coke serve as fuel in the cupola, but it supplies necessary carbon to the iron. Prof. Heine pointed out that coke needed for this function runs to about 10 per cent of the quantity needed for combustion. Another subject discussed at some length was humidity which varies widely over the year and can affect the operation of a cupola markedly. For example, on a 90-degree day a 25 per cent increase in coke charge could be required to overcome the moisture in the blast.

In the second discussion, Frank Lapour, Belle City Malleable Iron Co., Racine, Wis., described operational control of malleable duplexing using cupola and air furnace. In this practice, it was emphasized, cupola melting is more oxidizing than the making of gray iron. The setup which Mr. Lapour explained is comprised of two No. 9 front slagging cupolas which operate on alternate days and two air furnaces which operate on alternate weeks.

In the third presentation, R. H. Greenlee, Auto Specialties Mfg. Co., St. Joseph, Mich., described cupola-electric furnace production of malleable. In this practice, the malleable iron is produced in the cupola and the electric furnace serves only as a holding furnace. The speaker emphasized, therefore, that little change can be effected in the chemistry of the metal in the electric furnace.

At Auto Specialties, the malleable is produced in two front slagging cupolas and the iron is desulphurized in the ladle. The metal is transferred by ladle to the electric furnace which has 35 tons holding capacity. Iron is kept in the electric furnace from Monday through Friday, when the furnace is drained dry.

The company went from cold blast practice on its cupolas to 400° F blast some time ago and effected a substantial coke saving as a result. In addition, the iron is more uniform, melting rates are increased and the castings are annealed more readily.

Mr. Greenlee stated that the hot blast can be controlled within ±5° F. Carbon in the iron is run at 2.40 to 2.50 per cent, to average 2.45 per cent. Loss in the electric furnace during the holding period amounts to only 2 to 3 points. Practice of Auto Specialties for some time, Mr. Greenlee added, has been to make boron additions to the iron in the form of ferroboron. It was explained that this overcomes chromium pickup from the scrap, and it also has the advantage of reducing annealing time up to 35 per cent.

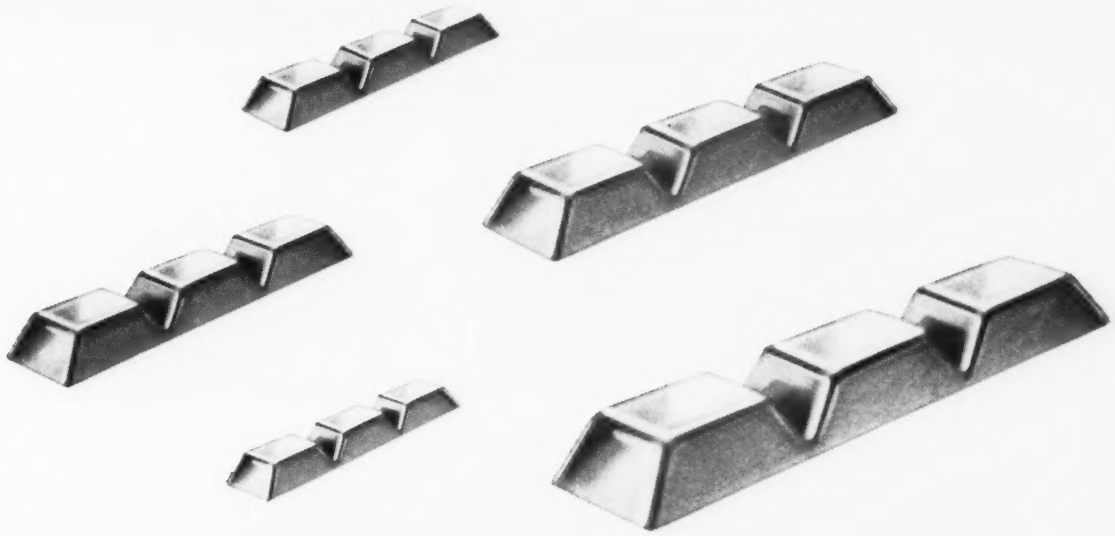
Members of the AFS controlled annealing committee served as the panel in discussing **Malleable Annealing Practice** at the second malleable shop course session. Panel members were J. T. Bryce, Albion Malleable Iron Co., Albion, Mich., F. W. Jacobs, Texas Foundries Inc., Lufkin, Tex., and L. R. Jenkins, Wagner Malleable Iron Co., Decatur, Ill. Eric Welander, John Deere Malleable Works, East Moline, Ill., session chairman, and William Zeunik, National Malleable & Steel Castings Co., Indianapolis, vice chairman, also members of the annealing committee, participated actively in the discussion.

The subject was introduced by a graphic presentation and analysis of the various phases of the malleable annealing cycle, with emphasis on the transformations taking place during the various stages of the anneal. Each panel member discussed at some length the annealing equipment his company uses and the techniques evolved for its operation. Problems of scaling, warpage, inoculants, packing, test bars, lugs or other testing samples, and temperature control stations within the furnace zones also were given consideration.

Time and temperature controls, atmospheres, reduction speeds, purging methods, test control procedures, length of phases, and total length of annealing cycle varied from plant to plant as different results were demanded from the end product. While slight variations in technique were evident, there was no apparent wide disagreement as to general procedures or practice.

(Concluded on page 168)

ALUMINUM ALLOYS FROM SMELTERS HAVE PROVIDED FOR YOUR GROWTH



In peace or war, in good times or bad, throughout the past 40 years the Aluminum Smelting Industry, composed of many independent firms, has stood as the *one steady, dependable* source of supply for foundrymen and die casters. In times of extreme demand for aluminum for wrought products, or whether aluminum was scarce or plentiful, Smelters have always been your steady suppliers.

You have found this to be true, and year after year have rewarded the Smelting Industry with the bulk of your ingot business.

REGARDLESS OF THE DEMAND FOR ALUMINUM FOR OTHER USES AND DESPITE INTERMITTENT OFFERINGS OF INGOT ALLOYS FROM OTHER SOURCES, FOUNDERS KNOW THEY CAN RELY ON THE ALUMINUM SMELTING INDUSTRY TO CONTINUE TO SERVE FOUNDRYMEN FIRST.

Constant improvement of aluminum casting alloys and service to you have always been, and will continue to be, our major efforts.

—that's your assurance of continuing supplies of aluminum alloys as you want them—when you need them—always.

An interesting article on the Aluminum Smelting Industry and its history appeared in the November issue of "Modern Metals." It's a question and answer article that tells many of the answers to questions bearing on your supply problems. Write for your copy today.

no foundry ever shut down because ingot was not available from smelters!

ASR

Aluminum Smelters Research Institute
20 North Wacker Drive, Chicago 6, Illinois

FOUNDRY COSTS

FEATURE of the Foundry Cost session was a question-and-answer panel which consisted of the following men, skilled in costing of foundry products: A. C. Sinnett, Terre Haute Malleable & Mfg. Co., Terre Haute, Ind.; C. R. Culling, Carondelet Foundry Co., St. Louis; C. E. McQuiston, Advance Foundry Co., Dayton, O.; J. A. Wagner, Wagner Malleable Iron Co., Decatur, Ill.; C. E. Westover, Westover Engineers, Milwaukee.

About 15 questions relating to cost systems were reviewed by members of the panel. These covered various branches of the industry, and one member of the panel prepared an answer to each of these questions. Mimeographed copies of the questions and answers were distributed at the meeting, and discussions were requested by panel members.

Included in the panel choices were subjects most frequently considered in establishing cost systems. Normalizing of overhead rates, stabilizing fixed costs, difference between estimating and actual overhead rates, frequent review of overhead burden rates and other cost factors were discussed. It was established that metals must be considered as a cost separate from melting department costs. Difference between metals melted and metals poured into molds should be considered as a part of melting costs. Administrative and selling costs should not be applied to cost of metals in arriving at total costs.

Other points stressed by panel members included the following: Core costs should be divided into core weight and direct labor costs; use of replacement value for determination of depreciation costs; cost of operating a cost system; application of excessive costs, due to short runs, to cost of a given pattern; determination of job start costs; set-up should not be included in standard cost of a casting; method of absorbing core sand costs in pricing and cost accounting.

In a discussion following the question: "Is determination of yield necessary for cost finding?" much difference of opinion arose. In the answer to this question panel member had stated it is necessary to know total mold metal weight for proper cost distribution. Difference between metals melted and metals poured into molds should be considered as part of melting costs. Mr. Culling pointed out that diverse opinions on all of these questions arises from the fact that the foundrymen attending the meeting were from various branches of the industry, i.e. malleable, gray iron, steel, etc. Therefore there is a difference in terminology. However, he stated, they are all doing the same thing, talking about the value of the metal.

Mr. Westover called attention to another point of disagreement when discussion followed the question concerning the difference between estimating rates and actual overhead rates. He observed it is easy to get off the subject. No matter how the measure of standards is set, a time is set for it. In some instances a strictly day rate is set. Men either meet, exceed or fall below that standard.

PLANT EQUIPMENT

Cupola Dust Collectors and **Development of Cupola Melting Equipment** were topics for two papers presented at a plant and plant equipment session. In the first, D. E. Gilchrist, Deere & Co., Moline, Ill., discussed air pollution control equipment for the cupola.

In his introduction, the speaker emphasized that one of the serious problems facing industry today is air pollution and the foundryman, in some cities, is being confronted by drastic ordinances intended to clean up the air of his particular area. Little trouble has been experienced in the past controlling the emissions from most foundry equipment, with exception of melting operations. Gas leaving the top of a cupola may exceed 2000° F due to burning of its CO gas. This makes design of collectors for melting equipment difficult, with only a few types being sold to foundrymen that will pass successfully all ordinances now in effect in various metropolitan areas.

Mr. Gilchrist stated there are more than 18 different types of smoke ordinances ranging from the severe Los Angeles County, Calif., code, to the common nuisance clause. He detailed some of the typical codes. The problem, he said, is to show small and medium-sized operators of cupolas how they can get the most for their money invested in dust control equipment.

In turn, the speaker described and submitted comparative data on centrifugal and inertia types, wet washers, centrifugal wet scrubbers, bag filters and electrostatic precipitators. When the prospective buyer gets a price quotation from the manufacturer he should also get a written statement regarding the relative efficiency of the equipment. When a choice is indicated, next step is to get approval of the equipment from the local enforcing agency. In conclusion, Mr. Gilchrist suggested that display of a friendly attitude towards neighbors by attempting to provide a clean atmosphere will go a long way in preventing demands for severe restrictive codes.

In the second paper, W. R. Jaeschke, consulting engineer, Whiting Corp., Harvey, Ill., described in much detail the development of cupola melting equipment. The cupola seemingly had its origin about the year 1700 when French founders conceived the idea of remelting pig iron and scrap in small furnaces about 24 in. high and 9 in. inside diameter.

In Colonial America, and then the United States, development paralleled that in Europe until about 1850. At this time the Americans contributed their first improvement with the hinged drop-bottom doors to overcome disadvantages of the solid bottom cupola. Basically the conventional cupola of today is not far removed from the early American design.

In his presentation, generously illustrated with slides, Mr. Jaeschke traced cupola design and operation, charging, duplexing, etc. The future is impossible to foresee accurately, he said, but indications are that there will be more mechanization automated to a high degree. The tendency may also be to more closed top cupolas of various design, tops including bell and double bell, and more recuperative types of preheaters where the waste gases must be cleaned.

See June issue for reports of papers on plaster mold casting, brass and bronze, light metals, patternmaking, education, industrial engineering, malleable iron and refractories.

160 used by one fertilizer manufacturer*

65 used by one chemical manufacturer*

more industries use more PAYLOADER® TRACTOR SHOVELS than all others combined

20 in one food processor's plants*

43 used by a large steel producer*

29 used by one producer of castings*

You Can't Compete If Your Equipment Is Obsolete

MILLIONS OF TONS of bulk materials are handled *daily* by "PAYLOADER" tractor-shovels in all kinds of industries. Sand, clay, coal, chips, chemicals, fertilizers, earth — all manner of materials are scooped up, carried, loaded, dumped, spread, unloaded and piled by these versatile, efficient machines.

Indoors and outdoors, they work fast and efficiently because they have high speeds in reverse as well as forward and maneuver easily and rapidly.

If you have bulk material handling problems, it will pay for you to find out how "PAYLOADER" tractor-shovels can help you too. There's a size and type to fit *your* need — eight models with capacities from 12 cu. ft. to 2 cu. yd. Your "PAYLOADER" Distributor is ready to give you full facts. The Frank G. Hough Co., 703 Sunnyside Ave., Libertyville, Illinois.

*name on request

PAYLOADER®
THE FRANK G. HOUGH CO. · LIBERTYVILLE, ILL.

INDUSTRY BRIEFS

ALUMINUM Co. of America, Pittsburgh, has consolidated all its foundry operations in a new Casting Division made up of Alcoa's die casting works at Garwood, N. J., and Chicago and of its sand, permanent and plaster mold foundries at Cleveland, Detroit, Bridgeport, Conn., Vernon, Calif., and Buffalo. The Cleveland foundry, reported to be the largest installation in the world devoted exclusively to sand casting of aluminum, is being furnished a new sand conditioning and delivery system.

* * *

Archer-Daniels-Midland Co., Minneapolis, has purchased the resin division of U. S. Industrial Chemicals Division of National Distillers Products Corp. U. S. I. resin plants at Newark, N. J., and Pensacola, Fla., are involved in the sale, along with inventories, formulations and trademarks. ADM produces many of the raw materials used in the manufacture of alkyd resins made at these plants. The Pensacola installation manufactures phenolic resins used in the shell molding process.

* * *

American Steel Foundries, Chicago, is subscribing, at par, to 100,000 ordinary shares of common stock of Bradford, Kendall Ltd., Sydney, Australia, manufacturer of steel castings. The Australian firm has manufactured products in Australia since 1924 under a license agreement with American Steel Foundries, which will continue to furnish technical services.

* * *

Ventilator Division, Swartwout Co., Cleveland, has opened a company-operated sales and service office at 547 Swede St., Norristown, Pa. George Barnes Jr. has been named sales manager in charge of the Philadelphia district. W. H. Cress Co., Portland, Oreg., has been appointed to handle sales and service for the company's Roof Ventilator Division in Oregon and in the area south of the Columbia river in Washington.

* * *

Eutectic Welding Alloys Co. of Canada Ltd. has acquired premises at 3150 37th St., Montreal, Que., for the manufacture of its special purpose alloys. The modern, brick building has 10,000 sq ft of area.

* * *

Rolle Mfg. Co., Lansdale, Pa., which recently announced it had been licensed to use the Osbrink process of producing close-tolerance sand castings, now advises that the licensing arrangement has not been effected.

* * *

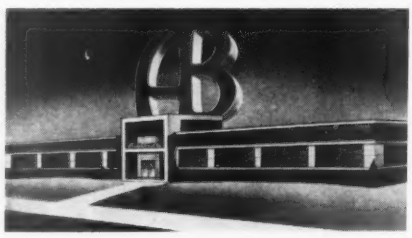
Southern Ornamental Casting Co., Huntsville, Ala., is constructing a new plant, including an already completed 50 x 100 ft all-steel building, and a 20 x 60 ft addition for production of aluminum, brass and bronze castings. Shelby Drake is president of the firm; Marvin E. Drake, vice president; William Hollingsworth, secretary and treasurer, and W. R. Newton, general manager.

* * *

Foxboro Co., Foxboro, Mass., is erecting a branch factory at 399 Preda St., San Leandro, Calif. The 8400-sq-ft building is scheduled for completion by Aug. 15. It will more than double the production area of the present San Francisco shop and provide facilities for the manufacture, sales and service of instruments and accessories.

* * *

Buehler Ltd., manufacturer of metallurgical testing equipment, has occupied a new plant at 2120 Greenwood St., Evanston, Ill., which covers 34,000 sq ft of floor space. It accommodates all manufacturing facilities of the company as well as offices and a large, modern display room. Adolph I. Buehler Inc., a closely allied company, adds to the scope of this display.



* * *

American Air Filter Co. Inc., Louisville, has purchased the entire plant and equipment of Ice Cooling Appliance Corp., Morrison, Ill., a subsidiary of City Products Corp., Chicago. The 152,000-sq-ft Morrison plant will be operated by AAF's Herman Nelson Division, Moline, Ill.

* * *

Wellman Engineering Co., Cleveland, has acquired the locomotive crane division and plant of Browning Crane & Shovel Co., Cleveland, and will operate the organization as the Wellman-Browning Locomotive Crane Division of the firm. Headquarters will be at 7000 Central Ave., Cleveland 4.

* * *

General Electric Co., Schenectady, N. Y., will begin construction this year of a $5 million plant at Shelbyville, Ind., to manufacture industrial furnaces, induction heating equipment and heating devices. When completed in 1955, it will accommodate manufacturing operations now located at Schenectady and at Pittsfield, Mass., and will be headquarters for GE's industrial heating department, a part of the company's Measurements and Industrial Products Division.

* * *

Arkansas Metals Inc., Jonesboro, Ark., has filed application with the Jonesboro city council to erect a foundry building. The company has been producing cadmium from scrap metal and will expand its production to include copper anodes. Eventually all production will be moved into the new building.

* * *

Phillips Corp. is the new name of the former Phillips Mine & Mill Supply Co., Pittsburgh, manufacturer of materials handling equipment. The firm will move about Aug. 1 to a new, one-story plant with 60,000 sq ft of space in Rosslyn Farms, a suburb of Pittsburgh.

* * *

American Brake Shoe Co., New York, will open a new sales and technical service office in Duluth, Minn., under the direction of John V. Houston Jr. Mr. Houston will be located at the office of Brake Shoe's Ramapo Ajax Division in Superior, Wis., until the new office is opened.

* * *

Bohn Aluminum & Brass Corp., Detroit, has opened a sales office for western New York in the Reynolds Arcade Bldg., 16 East Main St., Rochester, N. Y. Joseph H. Roberts will manage the new office.

* * *

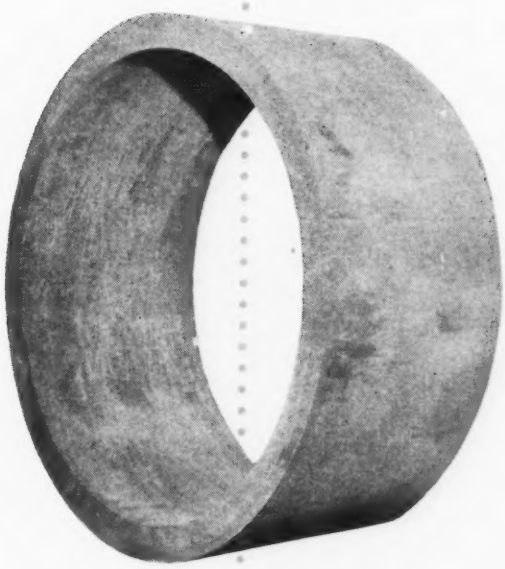
Big Three Welding Equipment Co., with 21 offices in Texas, Oklahoma and New Mexico, will distribute products of Rotor Tool Co., Cleveland, in those states.

* * *

Mercury Mfg. Co., 4044 South Halstead St., Chicago 9, has appointed the McKinley Equipment Co., 1003 South Santa Fe, Los Angeles, to represent it in that area.

LININGS FOR NONFERROUS CRUCIBLE FURNACES

THIS RING:
70 LBS.
18" I.D.
21" O.D.
8" HIGH



For speed and ease of installation—and low melting costs—you can't beat this lining. It consists of one-piece rings that are set by hand, and a back-up cement that you just mix with water and pour. A complete lining takes only 1½ hours to install. No hoists are needed, and a minimum of manpower.

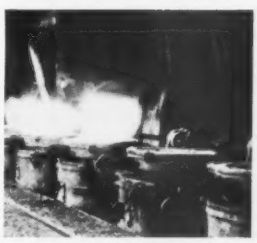
But most important, once in, you have the most nearly indestructible lining known. The rings are silicon carbide, and the castable cement is aluminum oxide bubbles. The rings act as a thin "armor plate" facing. Being only 1½" thick, there's more room for the cement—gives you more insulation. This combination *lasts 1½ to 2 years,* and frequently longer.

It also makes your furnaces work better. They heat faster. Usually use considerably less fuel per pound of metal melted. And it's not uncommon to get one or two extra heats per furnace per day!

WHY NOT CHECK UP? We make lining materials to fit every need—rings, ring segments, and cements. Let us help you get the most from *your* refractories.

No hoist needed to install

1½ hours start to finish



lasts 2 years or more

CARBORUNDUM
Registered Trade Mark
Dept. A-74, Refractories Div., Perth Amboy, N. J.

AROUND THE COUNTRY

NEWS REPORTS FROM

Los Angeles
New York
Philadelphia
Chicago

Los Angeles . . .

WITH casting requirements higher than at any time this year, most foundrymen are increasingly optimistic regarding future prospects. Almost all foundries report activity higher than a month ago—and far better than expectations. Many shops say their second quarter sales equalled or surpassed first quarter activity and ran very close to sales for the like period last year.

Foundry melting rates increased for the third consecutive month. Most steel foundries and a smaller percentage of nonferrous shops are now operating very close to 100 per cent of capacity. All are on five-day work schedule, with some overtime. Light casting producers, close to shutdown in February, are also on a 40-hour week.

Inquiries from a wide range of casting users are about 10 per cent more numerous, assuring a continued high level of activity. Most foundrymen say a third of all inquiries result in sales.

Backlogs of both ferrous and nonferrous foundries continue to lengthen, stretching beyond six weeks in most cases. This compares with backlogs of about two weeks in February.

Supplies of foundry scrap remain plentiful, but a firming of the local market has raised prices on No. 1 cupola cast from $40 to $42 per gross ton in certain cases. Foundries generally have scrap inventories sufficient to support about three-month's production and are purchasing only enough scrap to satisfy minimum needs.

West coast aircraft plants are humming. Foundrymen note that castings for new aircraft designs are being ordered with increasing frequency. Stepped-up orders from planemakers have boosted sales volume for magnesium foundries more than 15 per cent since January. Defense sales of magnesium foundries exceed 60 per cent of their total output, but commercial activity hasn't slackened, they say.

New York . . .

NOTHING much until fall is the way most gray iron shops view business at this time. Most iron foundries are operating three to four days a week, some no better than two days. With the vacation season near at hand, the general expectation is that everage operations will be off throughout July and August.

Machine tool specifications picked up early in this quarter, then lagged again. Foundries engaged in the production of manhole covers and other castings required in street and highway construction are doing better than most.

Steel and malleable shops are operating at a higher level than gray iron foundries, running at around 40 hours a week with backlogs of a month or more. Brass shops are not doing too badly but nevertheless are hungry for business. This is particularly true of those engaged primarily in maritime work. Aluminum casting producers are doing well, compared with other foundries. One district producer has about four-months' backlog and while this is well down from a year ago, this is exceptional. Defense work at this plant represents about 10 to 20 per cent of total operations. This is due to aircraft requirements alone. A year ago these requirements amounted to about 30 per cent.

The Moore Bros. Co., Elizabeth, N. J., producer of gray iron castings for 104 years, has withdrawn from the casting field. However, it is continuing to operate its machine shop under this name. Foundry equipment is being disposed of.

Philadelphia . . .

WITH the vacation season approaching, district foundry operations are scheduled for a further decline. Unless something unforeseen arises, the situation is expected to show little improvement before fall. Probably the lowest point will be reached around the July 4 holiday, when a number of foundries plan to suspend operations for a week. However, others, which are planning to suspend for mass vacations (and most of them are), will close down later, and thus will contribute to a lag throughout July and August.

Currently, gray iron jobbing shops are averaging around four days a week, with limited forces. Business with these jobbing shops is largely on a hand-to-mouth basis, backlogs averaging about two weeks at the most. However, pipe shops are active.

Malleable foundries seem to be doing reasonably well, due primarily to agricultural equipment needs and to a sustained volume of pipe fittings, which latter reflects good building activity. However, there is little railroad demand. Malleable shops are running at around five days a week. This situation as to operations also applies to steel foundries. Business with these shops is diversified, although there is little defense work, which is off substantially from a year ago and which accounts in particular for the sharp drop in backlogs, now ranging four to six weeks.

Brass and bronze founders are for the most part operating about five days a week. However, working forces have been reduced and volume as compared with a year ago is down at least 20 per cent, if not more. Prices of ingot metal have been advanced four times so far this year, but to date there has been no general increase in brass and bronze casting prices. Light metal casting producers are continuing to operate five days a week, with backlogs down sharply compared with a year ago. There has been a decline in aircraft work; in addition, the retooling and the improvements which went on a number of months ago to help handle the tremendous amount of work that then existed are having the effect of restoring backlogs to a more normal basis. Some shops report backlogs as now being four to six weeks.

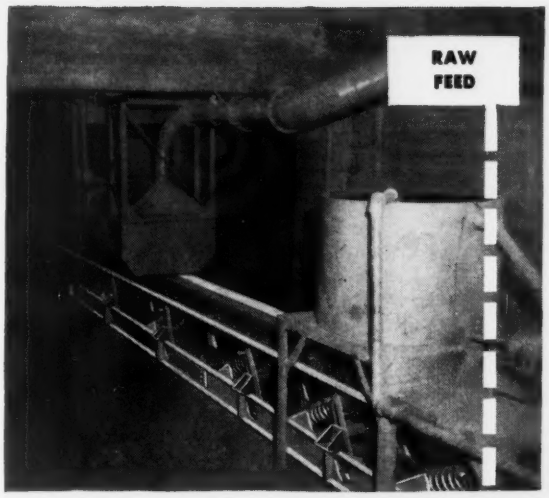
Chicago . . .

FOUNDRY operations are difficult to appraise during June and July. This is because many shops—jobbing foundries in particular—close down for varying periods for annual vacations. Around the July 4 holiday is a popular time for these suspensions, although some companies prefer later dates.

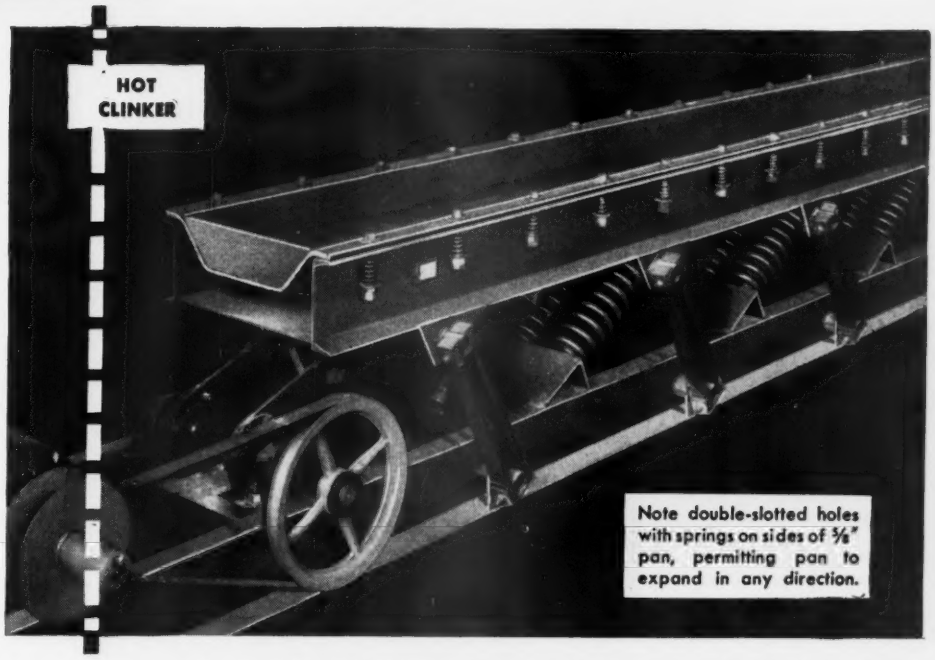
These vacation closings throw demand for materials like pig iron and coke out of kilter. In a time like the present, when requirements for castings have been touch and go, foundries have been holding inventories of iron and fuel to the barest minimums, since additional supplies needed quickly can be obtained without difficulty.

Before vacation, many foundries step up their operations to offset loss of production during the idleness. If the castings are stock items, man-

(*Concluded on page* 174)



TOUGH CONVEYING JOBS ARE *DUCK SOUP* FOR CARRIER ~~NATURAL-FREQUENCY~~ CONVEYORS



HIGH CAPACITY
Up to 80 tons per hour on 12" models!

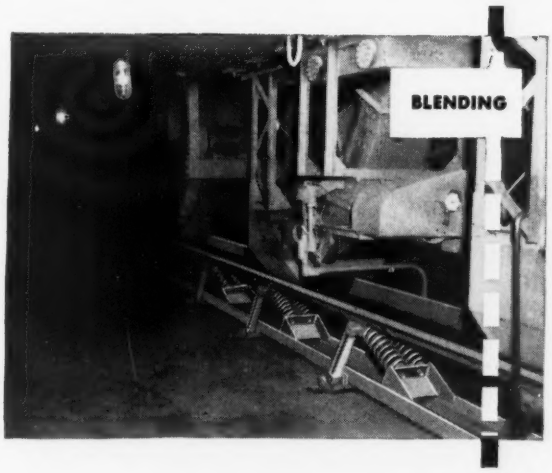
HIGH TEMPERATURE
Up to 750° F. on standard models — 1600° F. on high-temperature models!

HEAVY-DUTY SERVICE
Pans up to ¾" plate!

LOW HORSEPOWER ASSURES LOW MAINTENANCE
1000 foot-tons per hour per H.P.!

The toughest job in a cement plant—*conveying and cooling hot clinker*—comes naturally to the rugged Carrier Natural-Frequency Conveyor shown above. By comparison, the raw-feed and blending operations are just plain duck soup, but Carrier Conveyors do all three jobs with equal ease and economy.

Cement-industry applications represent only a fraction of the many uses for Natural-Frequency Conveyors. These amazing conveyors are now moving scores of other hard-to-handle products—things like mill scale and slag . . . bulk chemicals . . . castings . . . food products . . . sand . . . machine turnings—conveying and processing them with spectacular success. If you handle anything hot, sharp, wet, brittle, abrasive, jagged or oily, it will pay you to get all the facts. Use the coupon, *today!*



Get the Facts Today!

Carrier Conveyor Corporation
2104 Frankfort Ave., Louisville 6, Ky.

Gentlemen: Without obligation, please send complete information on Carrier Natural-Frequency Conveyors.

Firm_____

Street_____

City_____ State_____

Att: Mr._____ Dept._____

(*Concluded from page* 174)

agement may choose to build up a working stock. Other shops figure that at present rate of operations they can pick up any loose ends when the vacation is over.

For these reasons, interpreting demand for pig iron and coke isn't as reliable a guide to business activity as is the case at other times throughout the year. Foundry operations are best described now as spotty, with some shops operating only three days a week and a few doing five or six days.

Farm implement foundries are holding to the better rate they attained a couple of months ago. Automotive continues disappointing except for General Motors and Ford. If the rule holds that about 60 per cent of the year's assembly of cars is recorded in first half, then it is doubtful if foundries serving automotive needs will be as busy after July 1 as they were before. Demand for castings for general use is mixed —some lines strong, some weak. But nowhere is there pessimism; rather, guarded optimism prevails.

Of the Chicago district's 43 blast furnaces, 31 were operating in mid-June. One year ago, 41 furnaces were active. The shrinkage is attributed largely to reduced demand for hot metal for steelmaking but some part must be charged to foundries melting less pig iron.

Tom Makemson, Secretary Of IBF, Dies

Tom Makemson, secretary, Institute of British Foundrymen, died suddenly June 10. Mr. Makemson was also secretary of the International Committee of Foundry Technical Associations since it was organized in 1927.

TOM MAKEMSON

He worked for several years with Metropolitan-Vickers (formerly British Westinghouse Co.), in Manchester and later was graduated from Manchester College of Technology. He served in the Vickers foundry, as an apprentice instructor and in the research department, resigning in 1926 to become IBF secretary.

During World War II Mr. Makemson was loaned to the British Ministry of Supply, and became director for iron castings. In 1947 he was awarded the E. J. Fox Gold Medal of the IBF in recognition of his outstanding services to the British foundry industry as secretary of the institute. He made several visits to the United States as representative of the IBF and attended the annual meeting of the AFS International Foundry Congress in Atlantic City two years ago.

AFS Prints Booklet

The American Foundrymen's Society, through information supplied by its Plant and Plant Equipment Committee, has published a booklet, "Symposium on Molding Machines." Four papers are included covering the following subjects: Development and application of molding machines for production of light castings, development and application of machines for making of molds by slinging, jolt rockover molding machines for medium and large size castings, and special and automatic molding machines and molding units.

Copies of the booklet are available from the AFS, 616 South Michigan Ave., Chicago 5.

Meetings of Interest to Foundrymen

July 13-15—Western Plant Maintenance Show and Conference, Pan-Pacific Auditorium and Ambassador Hotel, Los Angeles

Sept. 13-20—Instrument Society of America, International Instrument Congress and Exposition, Convention Hall and Commercial Museum, Philadelphia

Sept. 21-23—Society for Experimental Stress Analysis, annual meeting and exhibition, in conjunction with first International Instrument Congress and Exposition, Bellevue-Stratford Hotel, Philadelphia

Sept. 27-28—Steel Founders' Society of America, fall meeting, the Greenbrier, White Sulphur Springs, W. Va.

Sept. 28-Oct. 1—Iron and Steel Exposition, Association of Iron and Steel Engineers, Cleveland Public Auditorium, Cleveland

Oct. 6-8—National Foundry Association, 56th annual meeting, La Salle Hotel, Chicago

Oct. 14-15—Michigan Regional Foundry Conference, University of Michigan, Ann Arbor, Mich.

Oct. 14-16—Foundry Equipment Manufacturers' Association, annual meeting, the Greenbrier, White Sulphur Springs, W. Va.

Oct. 18-22—National Safety Council, 42nd National Safety Congress and Exposition, Chicago

Oct. 27-29—Grinding Wheel Institute & Abrasive Grain Association, fall meeting, Edgewater Beach Hotel, Chicago

Oct. 28-29—Purdue Metals Casting Conference, Purdue University, Lafayette, Ind.

Oct. 29-30—New England Foundrymen's Association, New England Regional Foundry Conference, Massachussets Institute of Technology, Cambridge, Mass.

Nov. 1-5—American Society for Metals, National Metal Congress and Exposition, International Amphitheater, Chicago

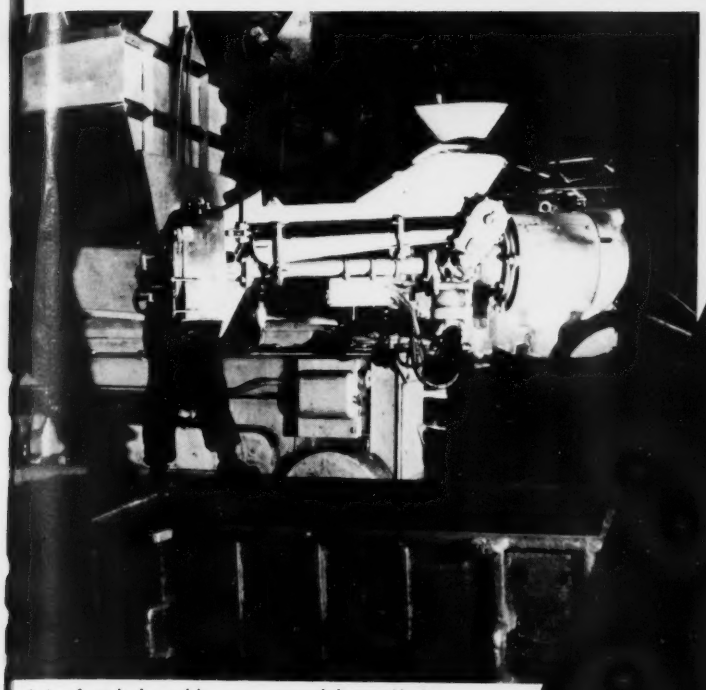
Nov. 10-12—Industrial Management Society, 18th annual time and motion study and management clinic, Sherman Hotel, Chicago

Nov. 11-12—Gray Iron Founders' Society, annual meeting, the Homestead, Hot Springs, Va.

Dec. 1-4—American Institute of Mining & Metallurgical Engineers, electric furnace steel conference, Hotel William Penn, Pittsburgh

1955

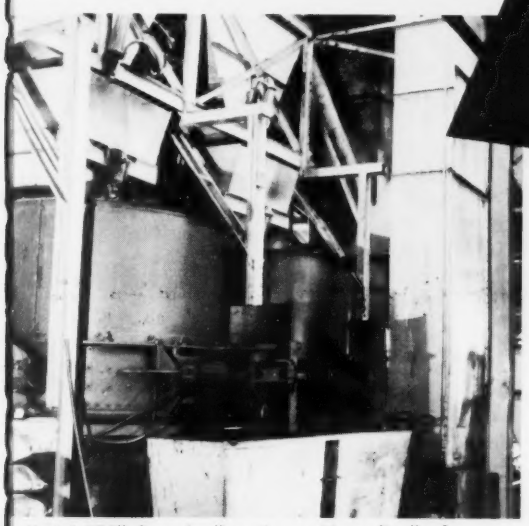
Mar. 28-Apr. 1—American Society for Metals, ninth Western Metal Congress and Western Metal Exposition, Pan-Pacific Auditorium, Los Angeles



of the foundry's molds are rammed by a Motive ndslinger. Surface quality and true-to-pattern ac- acy are essential for Wisconsin Grey Iron's castings.

3 TIMES CAPACITY

with SPEEDMULLORS and a SLINGER at Wisconsin Grey Iron Foundry



o Model "70" Speedmullors thoroughly mull all of sconsin Grey Iron's molding sand. Speedmullor Mull- matic precisely controls the mulling cycle—90 sec- s is required for a total cycle.

Model "40" Speedmullor replaced a conventional r in mulling all of Wisconsin Grey Iron's core sand. ntime and delays while waiting for core sand have eliminated.

Now with the installation of a Motive Sandslinger to ram all molds, two Model "70" Speedmullors to prepare all molding sand and a Model "40" Speedmullor for core sand, the Wisconsin Grey Iron Foundry has tripled their capacity from 25 tons to over 80 tons of castings per day. Costs have been considerably reduced too in this capacity boosting foundry mechanization.

The whole story is featured in July-August Better Methods—a copy is yours for the asking. The story tells in detail how Wisconsin Grey Iron replaced conventional mixers with Speedmullors enabling them to switch to synthetic sand and to mull all sand in the foundry. The story tells of the results obtained with fully mulled Speedmullor sand and Sandslinger ramming. Wisconsin Grey Iron is another one of hundreds of foundries producing top quality castings with Beardsley & Piper equipment.

write today for complete information

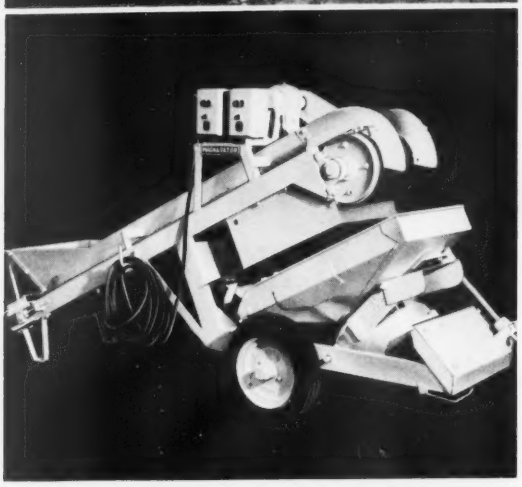
BEARDSLEY AND PIPER
DIV. PETTIBONE MULLIKEN CORP.
2424 N. Cicero Avenue, Chicago 39, Ill.

LOOK TO
BEARDSLEY & PIPER
FOR BETTER METHODS

MEMBER FEMA

The Screenarator

- Screening and aeration
- Directed discharge
- Capacities of 22, 30, and 45 tons per hour



The Magnarator

- Screening and aeration
- Directed discharge

plus

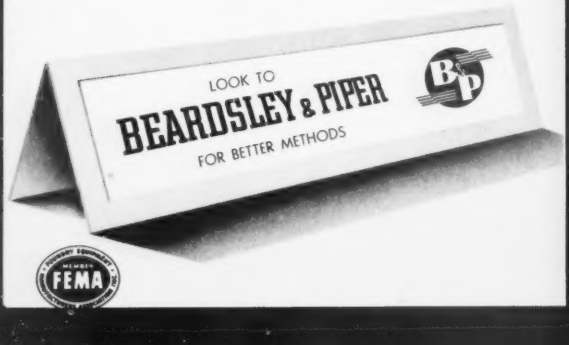
- Capacity of 30 tons per hour
- Magnetic separation
- One man portability

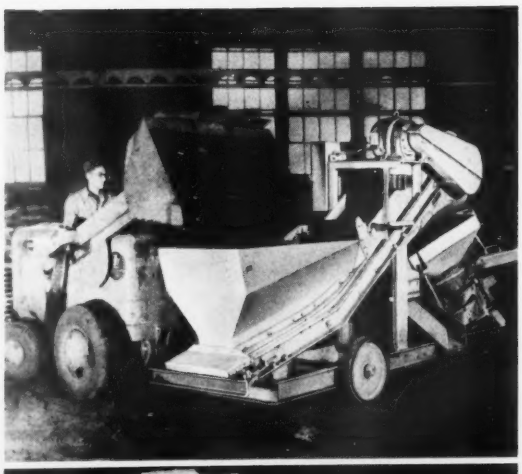
Check the combination of features you need in a floor sand conditioner

Check *all* of the features you need and then choose from the only complete line of floor sand conditioning machines. The 1953 Beardsley & Piper line with four star performers: the Screenarator, the Magnarator, the Jr. Nite Gang, and the Nite Gang.

Combinations of every important feature necessary for floor sand conditioning are included in this line. No foundry need settle for anything less when they can get every feature they need in one of these machines.

For information on complete low-cost floor sand conditioning to fit any budget, write today to *Beardsley & Piper, Div. Pettibone Mulliken Corp., 2424 N. Cicero Ave., Chicago 39, Illinois.*



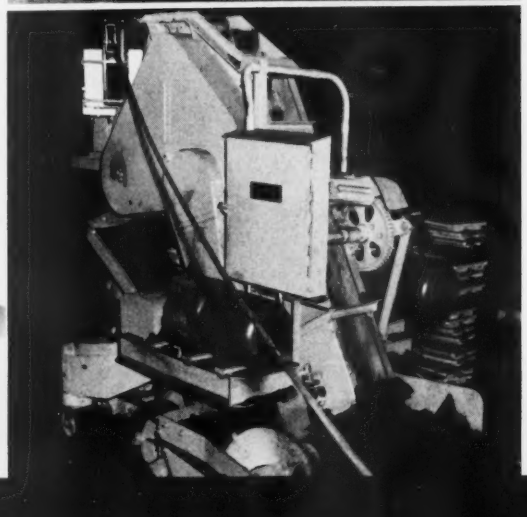


The Jr. Nite Gang

- Screening and aeration
- Directed discharge

plus

- Capacity of 40 tons per hour
- Magnetic separation
- Hopper loading from a front-end loader



The Nite Gang

- Screening and aeration
- Directed discharge

plus

- Capacity of 50 tons per hour
- Magnetic separation
- Self-loading
- Self-propelling
- Automatic cable reel
- Hydraulic elevator tilt

MAN-TO-MAN

By RALPH L. LEE

Lee Hobby Foundry Expansion Program

"I always say that if you set yourself up to make money in lean times, any darned fool can make a killing when things are booming"

WHEN interviewed, President Ralph L. Lee said, "As an expression of faith in the soundness of present business conditions and in the future of the foundry industry, Lee Hobby Foundry has just completed an expansion program which increases our facilities 20 per cent (96 square feet)."

It has always been the policy of the Lee Hobby Foundry organization to operate on the conservative side (progress with stability) and to move with caution in any direction involving the outlay of capital. The chairman of the board (Mother—that's Mrs. Lee, vice president in charge) has had a great deal to do with this policy.

In spite of this and any number of other articles I have written suggesting that every factor, including conservatively estimated future prospects should be taken into account before we invest additional capital, we felt that the time had come to grab the bull by the horns, so to speak, and face our gray-iron situation.

We still felt that exhausting every possibility of using present facilities to better advantage always should have first consideration, but concluded that even this noble rule could be carried to a riduculous extreme. In fact we had done it.

For instance, whenever we had a gray-iron job to do, practically every other activity in the place came to a halt. The cupola was so close to the molding machine that we had to disconnect the plumbing and move it out into the nonferrous melting department. All of the molding boards, flasks, jackets and stuff had to go with it.

Then, too, (I've never mentioned this on the outside) the cupola was so darned close to the wooden wall of the corner into which it was backed that I had my fingers crossed every time we fired it for fear of burning the place down. We'd have to take time to fill several fire buckets as a precautionary measure.

The wall opposite the spout was so close we had to use a stub tapping bar, and I must confess that on a hot summer day it got pretty hot tapping in such close quarters. There really wasn't room enough to get a good look into the tuyere peepholes back in the corner without getting scorched; and dropping the bottom sure did raise the temperature of the wooden walls to a much higher point than any wood should be asked to stand.

All of these disadvantages, without our realizing it, probably were responsible for permitting the nonferrous activities of our business to sneak into the center of the stage, crowding good old gray iron off, or practically so.

But the climax was the repeated, emphatic suggestions of Frank Steinebach (our distinguished editor) that I write an article on the Lee Hobby Foundry cupola, with drawings, dimensions and operating data. I had hoped that I would never have to admit what I am now going to say, but I guess it's best to come out like a man and face my shame. The truth of the matter is that I do not know how much air we have been blowing into the cupola or at what

President Ralph Lee puts the finishing touches on the cupola stack

pressure it has been blown.

Imagine trying to answer the many questions which have come into us from our readers regarding the cupola, much less trying to write an article about it, without knowing the dope on the air we were using. May I assure you that the reason for our ignorance was not laziness or neglect —the blower was so closely coupled to the wind box there wasn't room enough for a manometer or airflow meter. The glass tube for the manometer and a homemade anemometer have been hanging around the place for the last three years.

Now with the new addition, which will be devoted exclusively to gray iron, we'll get all set up to get the air dope, including humidity and temperature. Then we'll be able to hold the old head up in gray iron company. Please don't get the idea that we haven't been pouring good iron, however, for we have, and in very thin sections, too.

With room to do it in, there are many things we are going to try—nodular, calcium carbide inoculation, basic lining maybe, water cooling, possibly blast heating and dehumidifying and fly-ash collecting (although we've had no complaints from the neighbors over in the cemetery).

But the big thing is that we'll be able to get the dope necessary to do a good job of telling our readers how to go about building and operating a 10-inch cupola, if they are so inclined.

Then, too, we will not be so apt to dodge many requests we get for some tricky little gray iron castings the big fellows would rather not fool around with. We're really all atwitter about the new department, for we've been toying with the idea for a long, long time.

Aside from all this, though, it seems to me that this breathing spell from heavy back orders and production mad house is the time to scan the old horizon for time and effort wasting conditions which like Topsy just grew in the natural course of events, conditions which took root and grew without rhyme or reason until they were taken for granted to a point where changing them during busy times was simply out of the question.

In one of those man-to-man chats between old foundry friends which make conventions much worth while, Ed Trout of the Lufkin Foundry & Machine Co. 'way down in Texas said, "Doc! about this expansion program of yours, here's what I always say: If you set yourself up to make money in lean times, any darned fool can make a killing when things are booming." I had never heard it put that way before, and I feel quite sure he had a point, a darned good point. I know that what he had to say made me feel good about our new gray iron department.

Doing what he said, doesn't of course, mean putting up a new building like we did, or starting over from scratch. As I take it, it means spotting points of wasted time and effort, awkward situations, needless blind alleys, backtracking, rearranging the equipment we've got, scrapping some perhaps, tuning up operations at their present rate, improving inspection procedures, boring into the cost setup, including record systems and clearing out useless junk we've been tripping over for years—in other words, accepting conditions as they are and making a go of things in spite of them.

Well, anyway, that's what we're up to at the Lee Hobby Foundry, on a peewee scale of course, but doggone it, when you get down to it, size hasn't a darned thing to do with it, has it?

SLAG POTS ARE ACOMING: Loaded upside-down on a flatcar for shipment to the new nickel plant of Hanna Nickel Smelting Co., Riddle, Oreg., these 50-cu-ft capacity cast steel cinder pots will be used to carry slag from electric smelting furnaces. Specially designed for the job by Mackintosh-Hemphill Co., Pittsburgh, they have corrugated sides which permit them to "breathe" when the molten slag hits them, preventing heat distortion. The tilting lugs and lifting trunnions are integrally cast

Lebanon Foundry Brochure Describes Steel Casting

The entire process of steel casting manufacture, from design and engineering to final applications, is covered in the 32 pages of a new, two-color brochure published by Lebanon Steel Foundry, Lebanon, Pa. Beginning with a brief history of the company, the brochure describes and illustrates everything that goes into steel castings production at Lebanon. The brochure is written in non-technical language for easy assimilation by laymen, yet contains enough specific information to be of interest to foundrymen.

Copies of the Lebanon Steel Foundry brochure are available on request. Write on company letterhead to William H. Worrilow Jr., general sales manager, Lebanon Steel Foundry, 90 Lehman St., Lebanon, Pa.

ASTM to Publish Revised Laboratory Directory

The "Directory of Commercial and College Laboratories," previously compiled and published by the National Bureau of Standards, U. S. Department of Commerce, will be published in the future by the American Society for Testing Materials. The directory has been revised periodically since its first printing in 1927. It lists the location of testing laboratories with the types of commodities and the nature of the investigations the laboratories are prepared to undertake. Until the revised ASTM directory is completed, the present directory, National Bureau of Standards Miscellaneous Publication M187, will continue to be available from the Superintendent of Documents, Government Printing Office, Washington 25.

Most for your electrode dollar...

NATIONAL CARBON COMPANY'S Carbon and Graphite Electric Furnace Electrodes

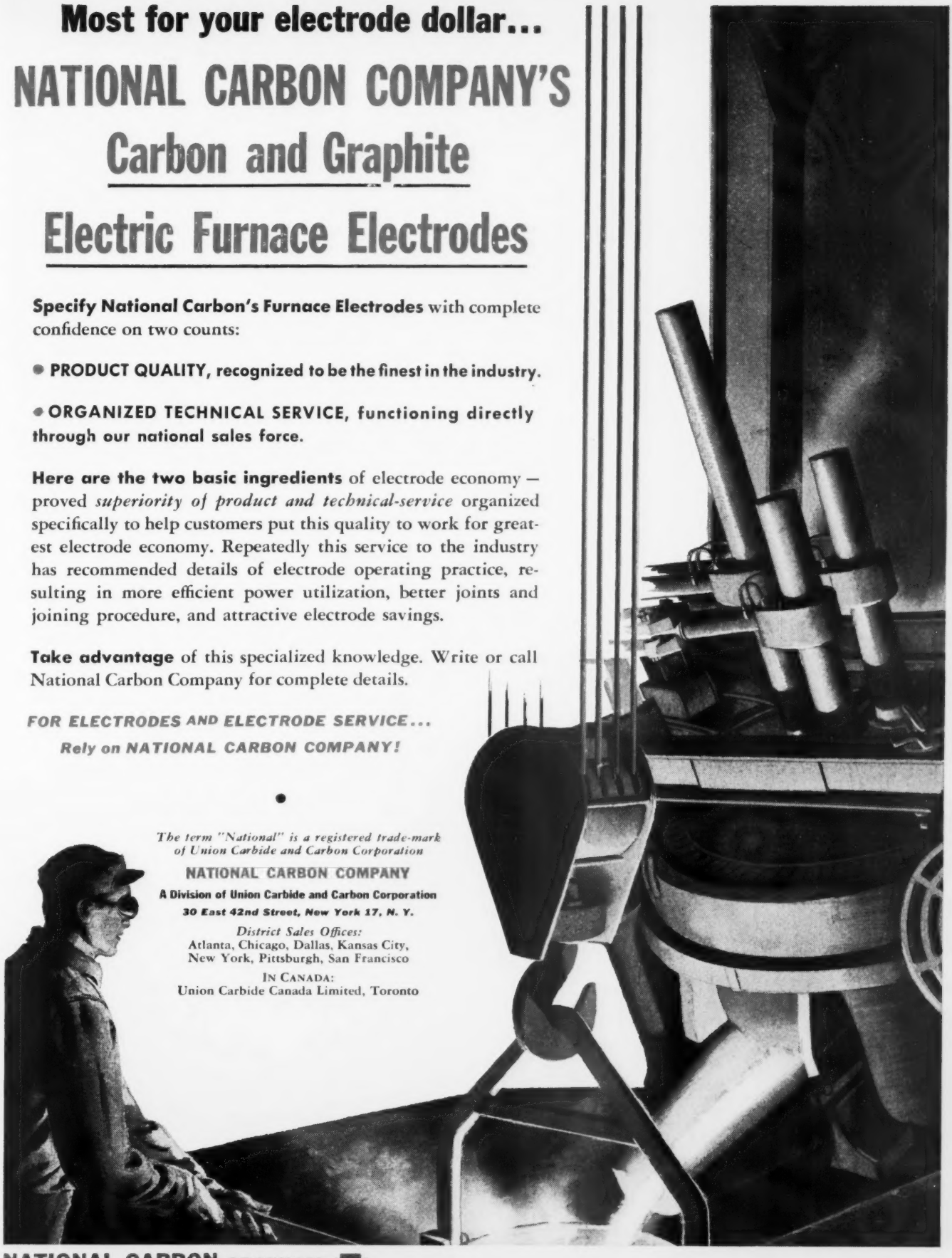
Specify National Carbon's Furnace Electrodes with complete confidence on two counts:

- **PRODUCT QUALITY, recognized to be the finest in the industry.**
- **ORGANIZED TECHNICAL SERVICE, functioning directly through our national sales force.**

Here are the two basic ingredients of electrode economy — proved *superiority of product and technical-service* organized specifically to help customers put this quality to work for greatest electrode economy. Repeatedly this service to the industry has recommended details of electrode operating practice, resulting in more efficient power utilization, better joints and joining procedure, and attractive electrode savings.

Take advantage of this specialized knowledge. Write or call National Carbon Company for complete details.

FOR ELECTRODES AND ELECTRODE SERVICE...
Rely on NATIONAL CARBON COMPANY!



The term "National" is a registered trade-mark of Union Carbide and Carbon Corporation

NATIONAL CARBON COMPANY
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street, New York 17, N. Y.

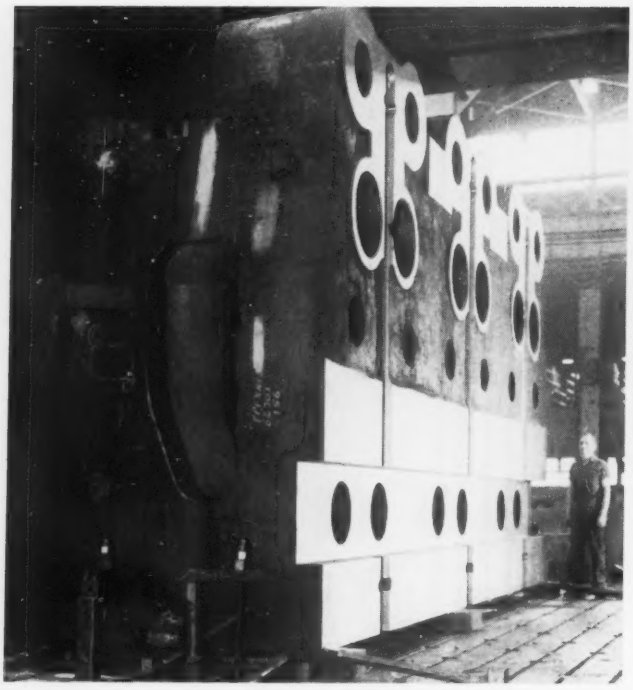
District Sales Offices:
Atlanta, Chicago, Dallas, Kansas City, New York, Pittsburgh, San Francisco

IN CANADA:
Union Carbide Canada Limited, Toronto

NATIONAL CARBON PRODUCTS

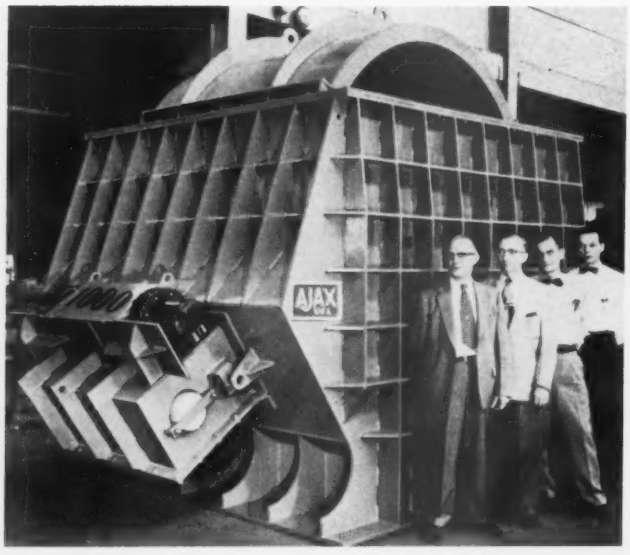
BLAST FURNACE LININGS • BRICK • CINDER NOTCH LINERS • CINDER NOTCH PLUGS • SKIMMER BLOCKS • SPLASH PLATES • RUNOUT TROUGH LINERS • MOLD PLUGS • TANK HEATERS

NEWS VIEWS



PRESS BASE: The base of a 35,000 ton forging press being built for the United States Air Force at the New Castle, Pa., plant of United Engineering & Foundry Co., is shown being machined on a 15-ft planer. Four large castings will be required to make up the base. This one measures 25 ft, 4 in. x 13 ft, 2½-in. x 6 ft, 3¾ in.

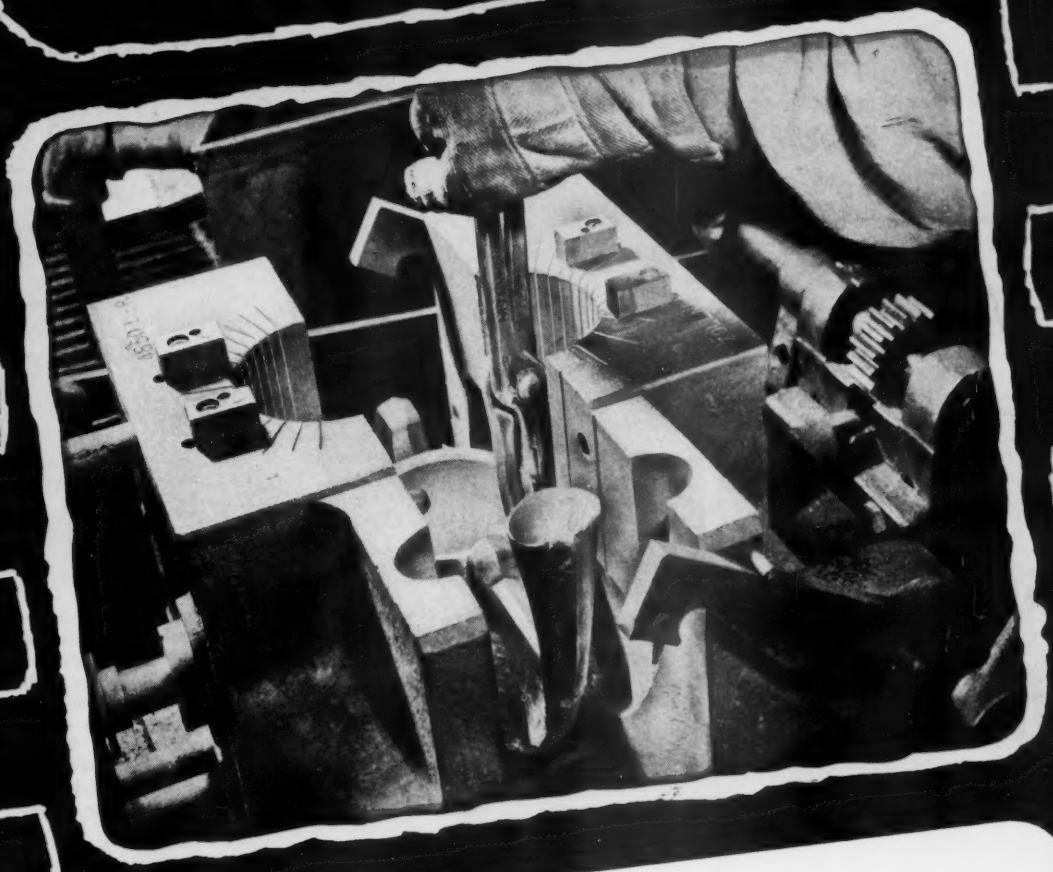
SAFETY FIRST: Foundry superintendent Joseph Kropka, Chain Belt Co., Milwaukee, is shown receiving the first-place award in the 100-200 employee group of the Self-Improvement Safety Contest sponsored by the Malleable Founders' Society. A. W. Bathke, Chain Belt Safety director is at left, and Fred Head, administrative assistant, Malleable Founder's Society, is presenting the award



1000th FURNACE: Ajax Engineering Corp., Trenton, N. J., recently culminated 12 years manufacture of low-frequency electric induction furnaces by producing its 1000th furnace. The unit weighs 50,000 lb and has a capacity of 31,000 lb of metal used for aluminizing steel. Shown with the honored unit, left to right, are John A. Anderson, superintendent, Wilfred Gray, assistant superintendent, and Lloyd Huff and John White, both engineers

DEDICATION: Robert H. Morse Jr. (left), president, Fairbanks, Morse & Co., shown at ceremony, May 19, dedicating his company's new plant at Kansas City, Kans. John R. Walsh, plant manager, is at right. The principal product of the new plant will be various types of pumps. Facilities include a highly mechanized foundry for production of gray iron, brass and stainless steel castings

telling the story of 'dag' dispersions



Dry-Film Mold Wash Solves These Foundry Problems

1. Prevents Sticking—A 'dag' Colloidal Graphite mold wash prevents sticking because it forms a micron-thin, exceptionally slippery, *dry lubricating film*. It speeds parting and assures smooth castings.

2. Goes On Easily—'dag' dispersions can be applied by spraying, painting, or dipping. Use them as parting compounds for permanent-mold casting and die casting . . . on molds, patterns, chills, cores, push pins, shoulder screws, flask pins, and ladle interiors. Parting will be quicker, castings smoother. Binding and stripping will be eliminated. Chills will tap off easily.

3. Works Without Smoking—Water dispersions of 'dag' Colloidal Graphite improve shop conditions by eliminating irritating smoke caused by most parting compounds.

And if you want to avoid chilling, use a 'dag' refractory mold wash.

You can learn more about 'dag' parting compounds by writing *today* for Bulletin No. 425-G3.

Dispersions of molybdenum disulfide are available in various carriers.

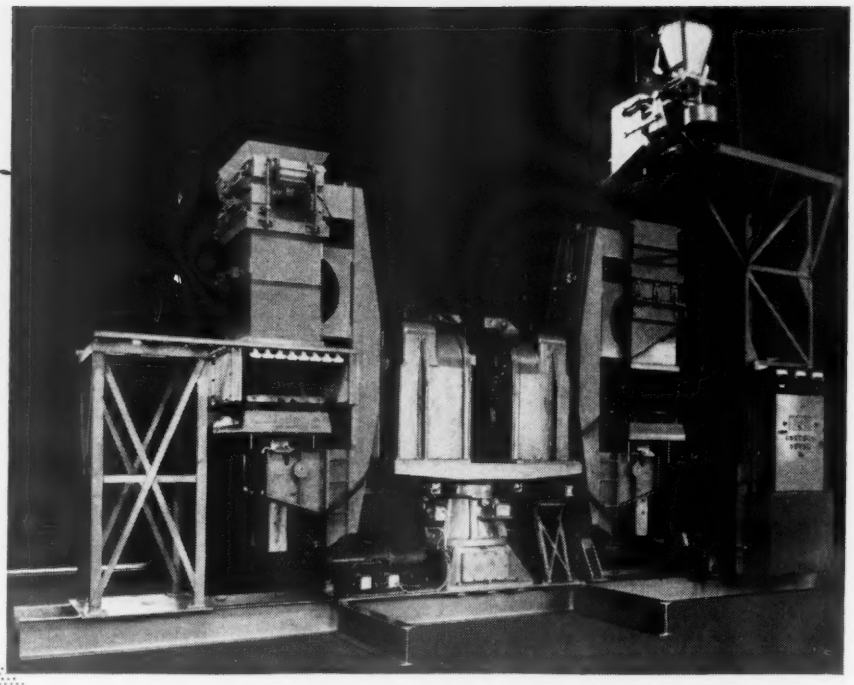
We are also equipped to do custom dispersing of solids in a wide variety of vehicles.

dag DISPERSIONS **Acheson Colloids Company, Port Huron, Mich.**

. . . also ACHESON COLLOIDS LIMITED, LONDON, ENGLAND

try 'dag' resin-bonded dry films for permanent lubrication

REDUCE SHELL MOLDING COSTS

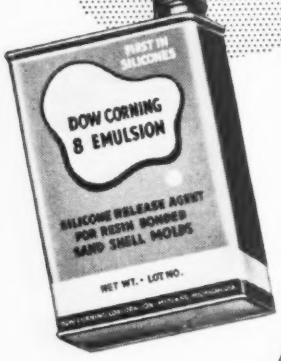


One of the series of large size machines made by the Shell Mold Division, Beardsley & Piper, this shell mold machine features two pattern and dump box assemblies alternating on a rotary table between a fixed oven and a constant level sand-resin hopper. Quick pattern change-over, automatic oven time-temperature control and vertical sand-resin riffled rainfall are featured. Capable of handling patterns up to and beyond 30" x 40", it is available in single and multiple pattern units and in continuous rotary machines involving 10 or 12 heads or more.

specify

DOW CORNING 8 EMULSION

...the Silicone Parting Agent that gives you clean, automatic release; helps assure fast, uninterrupted production



Whether you're using manual equipment or automatic machines, clean release is the key to dependably accurate shell molding at minimum cost. That's why you'll save money with Dow Corning 8 Emulsion. This non-corrosive, nonflammable silicone emulsion gives easy, positive release every time. It can't break down to form a carbonaceous deposit on even the most complex patterns. Cleaning costs are kept to a minimum because patterns stay cleaner longer. You also increase production of shells with consistently high dimensional accuracy.

Easily diluted in hard or soft water, Dow Corning 8 Emulsion is highly resistant to creaming or separating in storage or after dilution. Especially designed for the shell process, it is available at a new low price, 8% below that of previous emulsions. For more information and a free trial sample, write . . .

Send for sample TODAY

DOW CORNING CORPORATION, Dept. AH-19
Midland, Mich.

Please send me
☐ Free sample of Dow Corning 8 Emulsion
☐ Data on Silicone Release Agents for the Shell Process

Name _____

Company _____

Street _____

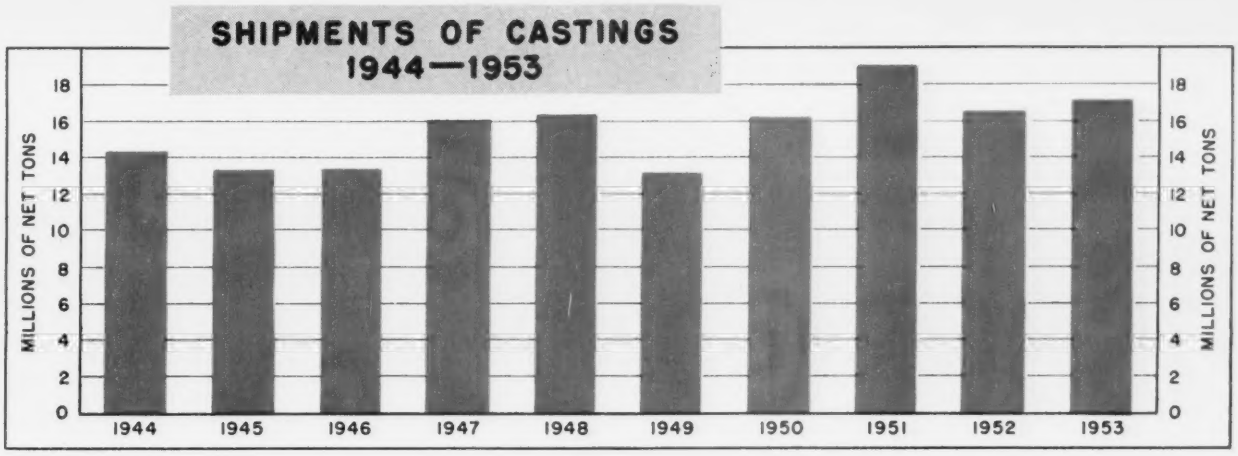
City _____ Zone ___ State _____

DOW CORNING SILICONES

DOW CORNING CORPORATION
MIDLAND MICHIGAN

ATLANTA CHICAGO CLEVELAND DALLAS DETROIT LOS ANGELES NEW YORK WASHINGTON, D.C. (Silver Spring, Md.)

Canada: Dow Corning Silicones Ltd., Toronto — Great Britain: Midland Silicones Ltd., London — France: St. Gobain, Paris



Report on the Foundry Industry

This discussion of various outstanding developments in the foundry industry during the last ten years was presented before the College-Industry Conference sponsored by the Foundry Educational Foundation in Cleveland, Mar. 10-11

By WILLIAM G. GUDE
Managing Editor

THE United States needs no iron curtain—either figuratively or in the form of an actual iron barrier. But if we had decided to build one last year, the metal poured into castings by our iron foundries would have been sufficient to provide an iron curtain 1 inch thick, 37 feet high and extending the 4000-mile length of our northern border.

On top of this curtain we could have erected a catwalk 3 feet wide and 1 inch thick with the metal that went into the nonferrous castings shipped in 1953. If we wanted to surmount it all with steel spikes 3 feet long, 4 inches in diameter, and space them 9 inches apart over the 4000 miles, the metal cast by our steel foundries last year would have more than sufficed for the job.

Fortunately, the foundry industry had more constructive uses for the castings it produced in 1953, and the requirements of its many customers rolled up the second highest volume of business in history from the standpoint of tonnage of castings shipped.

5 Per Cent Gain Over 1952—Deliveries of castings last year rose nearly 5 per cent to approximately 17½ million tons, according to compilations of the Bureau of the Census. This was almost 15 per cent better than the average of the first three postwar years of 1946-47-48 and was exceeded only by the record 1951 total of about 19¼ million tons. However, the 1951 tonnage was swelled by effects of the Korean-inspired defense program, whereas the influence of that demand had tapered by last year.

All types of castings showed heavier shipments in 1953 compared with 1952, except steel, the copper-base alloys and magnesium. Figures for the latter two metals were practically a stand-off from those of the year before. Gray iron casting deliveries of approximately 13,600,000 tons accounted for nearly 78 per cent of the 1953 total, while shipments of 1,830,000 tons of steel castings represented a little over 10 per cent. A decrease of about 5 per cent from 1952 activity in steel castings reflects to a large extent the tapering in ordnance needs. Malleable iron shipments of slightly under 1 million tons were somewhat more than 5 per cent of all casting deliveries, while brass and bronze, aluminum, zinc and magnesium shipments of about 1,100,000 tons accounted for the balance.

Aluminum Outstanding — Aluminum was the outstanding performer of the nonferrous cast metals last year. Shipments increased 27 per cent over 1952 to the highest level in history. Part of the demand may be attributed to aircraft requirements, although the broadening markets for this light metal in various types of civilian goods have accounted for a large share of recent gains in consumption.

A major part of the increased activity in aluminum castings was the result of the spurt in demand for the metal in die cast form. Shipments of aluminum die castings in 1953 exceeded those of aluminum sand castings for the first time and represented 37 per cent of all aluminum castings produced. Sand castings accounted for 33 per cent and permanent mold castings for 30 per cent. Compared with 1952, shipments showed increases of nearly 50 per cent for die castings, 40 per cent for permanent mold and 12 per cent for sand.

A considerable part of last year's shipments of all types of castings was accompanied by a shrinkage in backlogs. The 12 months saw unfilled orders of foundries decline in amounts ranging from slightly under 30 per cent for gray iron and aluminum shops to as high as 57 per cent for steel foundries.

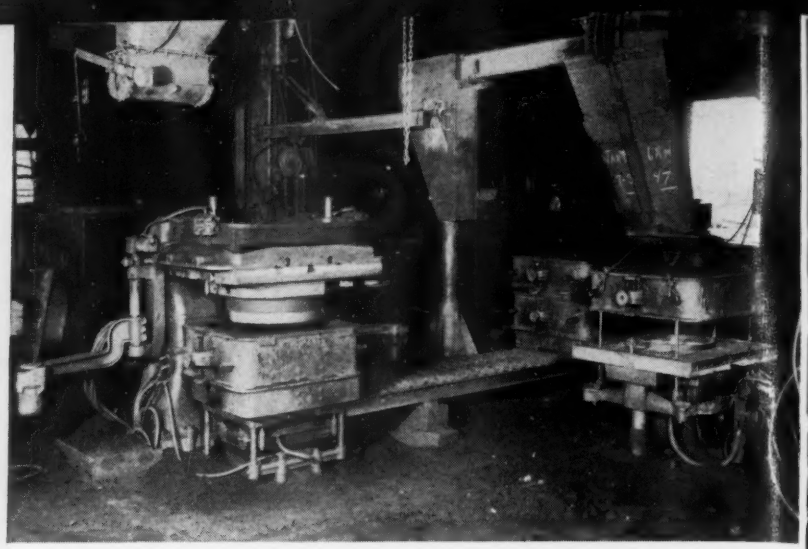
This situation was not peculiar to the foundry industry but found its counterpart among the steel mills and other producers of basic materials. It represented a catching up of supply with demand after an extended period in which the seller was king. Buyers responded by trimming their inventories, sharpening their pencils and adjusting their new orders to call for relatively early delivery.

Anticipates the Swings—It has almost invariably been true that demand for castings anticipates the swings in general industrial activity, and such a situation prevailed last

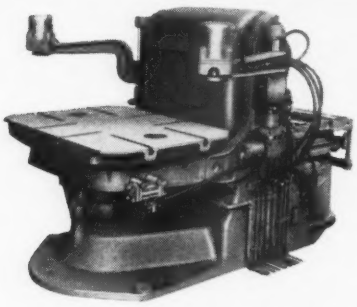
(Continued on page 186)

OSBORN

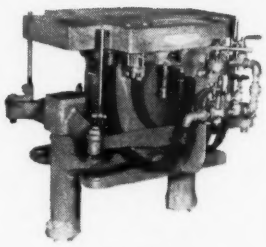
. . . the complete line of molding machines, core blowers



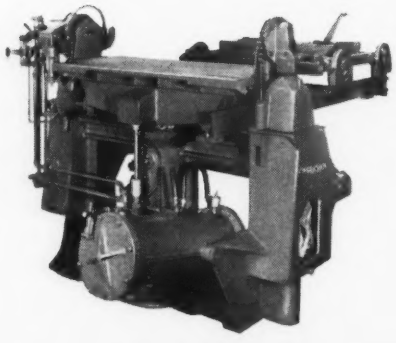
OSBORN No. 643 Jolt Rockover Draw (left) makes drags.
OSBORN No. 540 Jolt Stripper (right) makes copes.



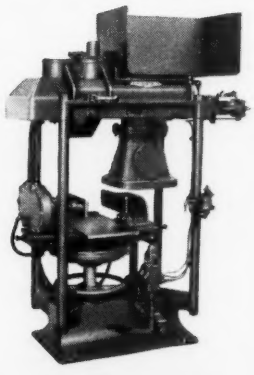
JOLT ROCKOVERS



JOLT STRIPPERS



JOLT ROLLOVERS

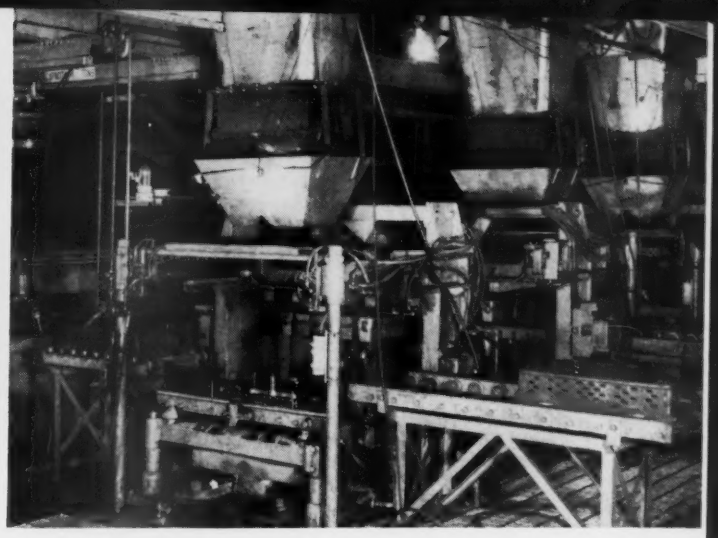


CORE BLOWERS

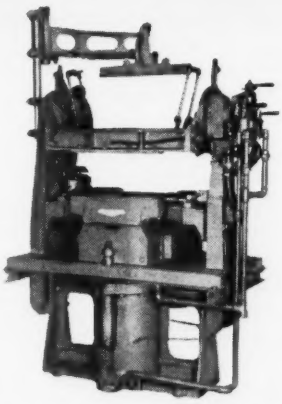
- **DESIGNED FOR LOW-COST OPERATION**
- **PRECISION-BUILT FOR DEPENDABLE PRODUCTION . . . TO CUT COSTS**

OSBORN Diaphragm type core blower with automatic controls producing cores for pipe fitting molds.

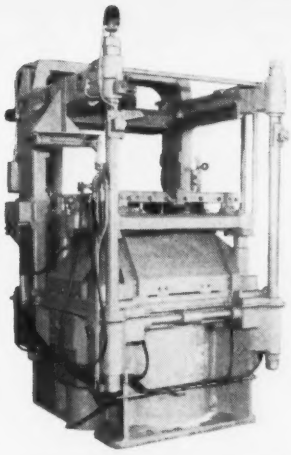
OSBORN No. 333 Jolt Rollover Squeeze making large drag molds.



OSBORN No. 1230 Jolt Squeeze Strippers making drags and copes for automotive cylinder heads.

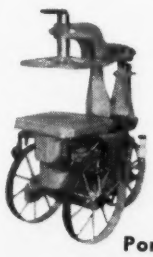


JOLT ROLLOVER SQUEEZERS



JOLT SQUEEZE STRIPPERS

OSBORN ROTA-LIFT



Portable

Post Type

SQUEEZERS

OSBORN Jolt Squeeze molding machines are available with wheels or pedestal base.

BUILT TO MACHINE-TOOL STANDARDS

With Osborn equipment, you are sure of getting *continuous,* efficient production of molds and cores . . . at lowest cost. That's because Osborn machines are built from the finest materials . . . machined to precision standards. Osborn repair parts can be purchased with assurance too, because they will always fit. Use of jigs, fixtures and precision tools such as jig mills provide complete interchangeability of like parts.

Other specially-designed machines with automatic controls are available for unusually high production requirements. For complete information on any Osborn machine, write The Osborn Manufacturing Company, 5401 Hamilton Avenue, Cleveland 14, Ohio.

OSBORN

MOLDING MACHINES CORE BLOWING MACHINES

Another example of Osborn leadership and advanced engineering

SAVE FINISH GRINDING TIME
with
WiltOmatic
POWER VISES

USING VISE X, CLAMPING TIME ½ MINUTE

USING WiltOmatic, CLAMPING TIME 3 SECONDS

WiltOmatics are real time savers and they're safe too! Foot pedal control frees both hands for work; jaw opening adjusts simply by rotating handle. WiltOmatic's super strength produces powerful, vibration-proof grip that holds large or small objects fast, safe and easily. Foundries report that WiltOmatic pays for itself from savings in 26 days!

see the difference in time and profits with
WiltOmatic
—world's first air-hydraulic power vise and manually powered bench vise

WILTON TOOL MFG. CO. Inc.
925 Wrightwood Avenue Chicago 14, Ill.

ATTACH THIS AD TO YOUR LETTERHEAD AND MAIL TO US FOR A FREE 10 DAY TRIAL OR FREE LITERATURE F-7

"FALLS BRAND" ALLOYS
AMERICA'S LARGEST PRODUCERS OF ALLOYS

"FALLS"
COPPER MASTER ALLOYS

Calcium Copper . . . . . Cobalt Copper
Chromium Copper . . . . . Iron Copper
Magnesium Copper . . . . . Manganese Copper
Nickel Copper . . . . . Phosphor Copper
Silicon Copper . . . . . Tellurium Copper

WRITE FOR COMPLETE DETAILS

NIAGARA FALLS
Smelting & Refining Division
BUFFALO 23, NEW YORK

(*Continued from page* 183)

year. The start of the gradual downtrend in casting shipments predated the slippage in steelworks operations and other business indexes by several months.

So much for the commercial aspects of cast metal products. Turning to the technical side we find that in no other period in the history of the foundry industry have so many noteworthy developments occurred in casting methods, equipment and materials as have taken place the last ten years. The effects of these developments so far have been only partially felt, but their influence will become increasingly important in the years ahead.

This situation makes it mandatory that the individual foundry keep abreast with the trend toward newer methods if he is to keep his costs in line. At the same time, the improvements in products and processes offer the means for maintaining or strengthening the position of the foundry industry as a whole in its competition with other forms of fabrication.

Molding Developments Numerous—Molding machines and molding methods have figured most prominently in developments of the last five years. Certainly they have attracted the most attention. Shell molding and the various devices used with the process have grabbed the biggest headlines, but there has been notable progress in improving equipment for use with conventional sand mixtures.

High production and automatic operation feature the latest designs of molding machines, some of which are said to have capacities of 250 to 300 half molds per hour. The newer jolt-squeeze machines are of two general types: One, the rotary type, employs multiple stations and patterns; the other, the push-through type, operates with only one pattern at a time but may be used in pairs to provide both a cope and a drag.

Another new machine employs no jolt and performs a squeeze by means of a rubber diaphragm under which the sand-filled flask is positioned. Because full air line pressure is applied through the diaphragm over the entire top surface of the mold, a harder ram is obtained than by means of the conventional squeeze piston under the same air line pressure. Moreover, the flexibility of the diaphragm, in contrast to the rigidity of the usual squeeze head, promotes uniformity in ram hardness by adjusting itself to the contour of the pattern.

Unusual feature of still another molding machine developed recently is that it incorporates two permanent mold forms or boxes for molding the cope and drag, thus doing away with use of individual flasks. It is intended to handle matchplate work and molds both cope and drag in one cycle at high speed.

A Swiss machine that has attracted some interest in this country is a double-head jolt-squeeze unit that rams the cope and drag simultaneously. A pushbutton-actuated machine, it incorporates a mechanical mold closing device, and even in the production of relatively large molds is said to be easily handled by a woman.

A variation of the foregoing machines is a high-speed, automatic two-station unit of the rotary type which is especially adapted to production of large molds. The pattern for one mold half is drawn while the mating half is being rammed. Ramming action is applied entirely by jolting, although part of the jolting is done while heavy weights are resting on top of the mold. These weights assist in compressing the sand in the upper portion of the mold.

Mold blowing, a process that has been studied ever since the successful development of the core blowing machine, has been proved practical in actual use. One unit now available follows the blowing operation with a squeeze operation.

A blowing operation also is employed in the recently developed "D" process. In this case, however, a conventional type core blower blows a shell into a special drier. Nature of the mold produced makes the process more nearly comparable to shell molding, but instead of employing a resin binder, the sand mixture includes a fast-baking oil.

Shell Molding—A variety of makes of shell molding machines have been introduced the last few years. They differ in the size and rate of shells they can produce and in the number of automatic features they incorporate. Some foundries have developed machines of their own design.

Like any radically new process, shell molding has yet to demonstrate definitely what share of the casting market it can expect to capture and retain. It has proved to be an intriguing subject, as has been demonstrated by the widespread interest of foundrymen in literature and exhibits concerning it. Although a relatively large number of foundries have done experimental work with the process, probably only about

(*Continued on page* 189)

NOW... WILLSON INTERCHANGEABLE RESPIRATORS

IN BOTH SINGLE AND DOUBLE CARTRIDGE STYLES!

Single-Cartridge Series 400
NOTE: The cartridges and filter shown for use in the Series 400 single-cartridge respirator are exactly the same as those used in the Series 800 double-cartridge respirator and can be used interchangeably in both. The other five cartridges, filters, and combinations are recommended for use only in the Series 800 respirator.
No. 441
No. 442
No. 443
No. 460
#41 Cartridge for Organic Vapors (BM2308)
#42 Cartridge for Acid Gases
#43 Cartridge for Organic Vapors and Acid Gases
(BM2161) #R415 Filter for Dusts and Mists (BM2162)
#41 Cartridge and #R415 Filter for Dusts and Organic Vapors (BM2308)
#41 Cartridge and #R472 Filter for Paint Spray
#44 Cartridge for Ammonia
#R361 Filter for Metal Fumes, Dusts and Mists (BM2149)
#R436 Filter for Radioactive and Beryllium Dusts, Mists or Fumes
No. 841
No. 841
No. 841P
No. 842
No. 844
No. 843
No. 880A
No. 860
No. 890
Double-Cartridge Series 800

These Willson Respirators are the first truly interchangeable types in the field. Neither style requires additional parts or accessories to make use of the cartridges, filters, or combinations indicated to be used with them.

Write for bulletins describing these new Willson Interchangeable Respirators. Standardizing on them will give you the respiratory protection you want and simplify your inventory as well.

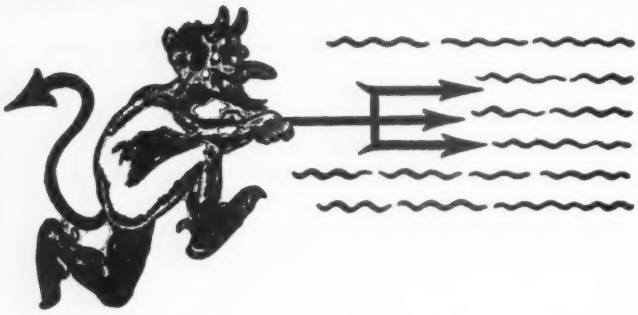
More than 300 Safety Products Carry This Famous Trademark

WILLSON®

Established 1870

WILLSON PRODUCTS, INC., 237 Washington Street, Reading, Pennsylvania

Soffel's



FLUXES and EXOTHERMIC COMPOUNDS

for all

Metals and Alloys

THERMOTOMIC "X" COMPOUND is an exothermic material which is molded and baked into necked down riser cores and inserts. It produces a temperature of 3500° F. and is used as ring inserts under the risers or feeding heads. Great savings are realized through reduced riser dimensions and cleaning costs. In conjunction with Thermotomic Compounds, Carbon Free Liquidizer No. 5 should be used on top of the metal in the heads.

THERMOTOMIC ABC—For aluminum and magnesium castings, necked down riser cores and inserts—prevents piping and shrinkage into castings. Soffel's ALX-31 Liquidizer should be used on top of the metals in the head.

THERMOTOMIC HoTop LIQUIDIZER — For short risers—saves 60 to 70% of feeding metal in the heads.

EXOTHERMIC CARBON FREE LIQUIDIZER—A feeding head compound for castings and ingots of ferrous and non-ferrous metals — saves metal and prevents piping and shrinkage.

CARBON FREE LIQUIDIZER AL-X31—For aluminum and magnesium feeding heads—prevents piping.

EXOTHERMIC INSULATING SLEEVE CORE COMPOUND—For riser sleeves—adds heat and prolongs fluidity of feeding metal in heads or risers.

DENSILTITE LADLE FLUX—For iron and semi-steel—reduces sulfur and phosphorus. Adds fluidity and temperature in pouring ladles—produces clean iron.

SOFFEL'S NON-FERROUS FLUXES

BB-2—For red brass, nickel and tin bronze pressure castings—removes sulfur, iron, phosphorus oxides and gas from brass and bronze.

SUPER BRASS FLUX—For brass and bronze—prevents oxidation of zinc.

BRASS REFINING FLUX—For cupola melting and open flame furnaces — prevents oxidation. Produces liquid slag and faster melting.

COVERALL BRASS FLUX—Removes gas and oxides from yellow brass and nickel silver.

RADIOCLARITE BRASS FLUX—For open flame furnace melting—Increases fluidity, tensile strength, removes gas, oxides and iron.

AB-6 BRASS FLUX—For electric furnace melting of brass and aluminum bronze—keeps furnace linings clean.

KLEEN-ALL BRASS CLEANER—For use in bottom of pouring ladles or open flame furnaces to absorb liquid slag and keep the furnace and ladle linings clean.

BRASS ALUMINUM REMOVER — Removes all traces of aluminum from copper, brass or bronze.

HI-LED BRONZE FLUX—Holds lead up to 50% in copper without use of nickel.

NICKEL MONEL FLUX — Removes gas and adds fluidity to metal.

ALUMINUM BRONZE FLUX—A perfect deoxidizer for reducing aluminum and iron oxide in manganese bronze and aluminum bronze. Adds fluidity.

COPPERTITE FLUX—For high conductivity castings—removes cuprous and cupric oxides and gas from copper.

FERRO-OUT IRON REMOVER—Removes free iron or alloyed iron from brass, bronze or copper.

SOFFELITE ALUMINUM FLUX—Removes aluminum oxide and iron from aluminum and increases the fluidity and tensile strength.

MAGNALUM FLUX—For magnesium and aluminum alloys—removes gas and oxide and increases fluidity.

KLEN ZINC FLUX—A deoxidizer and purifier for zinc base pressure die castings—removes gas, sulfur and iron.

DIE COATING—For pressure zinc base die castings—will not scale, blister or create gas in the molds.

PERMANENT MOLD COATING—For aluminum and magnesium castings — adds longer life to molds. Produces clean gas free castings.

POT COATING—For iron pot melting — increases life of pots. Prevents iron pick up.

U. S. Patents No. 2,490,327 and No. 2,500,097

PITTSBURGH METALS PURIFYING COMPANY

World's Largest Manufacturer of Fluxes and Purifiers For All Metals and Alloys

1352 MARVISTA ST., N. S. PITTSBURGH 12, PA.

(*Continued from page* 187)

200 so far have entered commercial production. In this group, however, are some of the country's largest foundries.

Some indication of the trend in production of shell-mold castings is indicated by foundry consumption of phenolic bonding resins. A recent article in *Modern Plastics* magazine says that 1953 consumption of this resin for shell molding was 9 to 10 million pounds, compared with a little over 3 million in 1952 and about 1 million in 1951. It adds that resin producers are hopeful that consumption will reach 50 million pounds by 1957.

An innovation in green sand molding which has recently been in the development stage is the use of unusually high pressure. This will produce molds capable of forming castings to close tolerances, thereby minimizing the amount of machining subsequently required.

While on the subject of mold materials, reference should be made to the permanent graphite molds employed in a steel car wheel casting method developed by the Griffin Wheel Co. A unique feature of this process is that instead of pouring down a sprue and filling the mold by gravity, the mold is clamped over the ladle and the molten steel is forced upward through a spout into the mold cavity by air pressure admitted to the chamber surrounding the ladle. Pouring time is about 4 seconds.

Another reusable mold material is a combination of plastic and carbon with which the Rand Development Co. of Cleveland is said to have had some promising experimental results.

Foundry Melting Furnaces—Several noteworthy developments have occurred in foundry melting furnaces in recent years. The cupola remains the old reliable unit for melting iron, but it has undergone a face lifting in some designs. These include—either singly or in combination—such features as water cooling, closed top, elimination of the drop bottom, basic lining, graphite well, preheated blast, and simplified methods of igniting the bed. Some cupolas now rather closely resemble the blast furnace in design and operation, with their bell and hopper top and their ability to be banked at will.

In connection with cupola design, mention also should be made of the more efficient facilities now available for collecting dust emissions from cupolas by wet, dry or electric precipitator types of equipment. Mechanical charging of cupolas, although not a new development, also has been more widely adopted and has contributed to the steady reduction in manual efforts required of foundry workers. Approximately three-fourths of existing mechanical charging units were installed within the last ten years.

The electric furnace of both the arc and induction types has found increasing application for both ferrous and nonferrous melting. Progress also has been made in the adoption of electricity as the heating source for malleable iron annealing furnaces and core baking ovens.

Sand Reclamation Studied — The subject of reclamation of used molding sand has received closer study in recent years. Demonstrated economic advantages in use of such equipment for certain size foundries seem likely to result in their wider employment in the future. Another factor that may increase their use in large cities is the one that prompted a heavy equipment builder to design a reclamation unit for its own foundry—it had used up all available land nearby for dumping used sand. In addition to the wet type of reclamation equipment, a recently developed unit that scrubs the sand by pneumatic action also is on the market.

The impression may have been given that the major part of the various types of equipment described here is designed solely for the high-production foundry. Some of it definitely is. However, if an analysis is made of the mechanized and labor saving devices that are also adapted to small plant use, it is surprising the extent to which it is possible for the small jobbing shop to modernize and make more efficient various of its operations.

A study recently was completed by FOUNDRY (see May issue) of the number and age of various types of major equipment used by foundries. The study reveals the extent to which small shops have adopted mechanized devices. For instance, the smallest foundries—those with fewer than 20 employes—have nearly 1000 core blowers. More than 90 per cent of these units were acquired within the last ten years.

Ninety per cent of the 175 mechanical shakeouts in plants of

(*Concluded on page* 192)

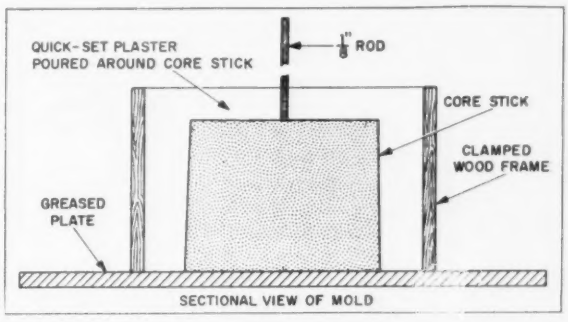
HOW TO DO IT

Use Compressed Air To Remove Core Stick from Plaster Mold

By ORMIE R. SCOTT
Patternmaker
James R. Kearney Corp.
Guelph, Ont.

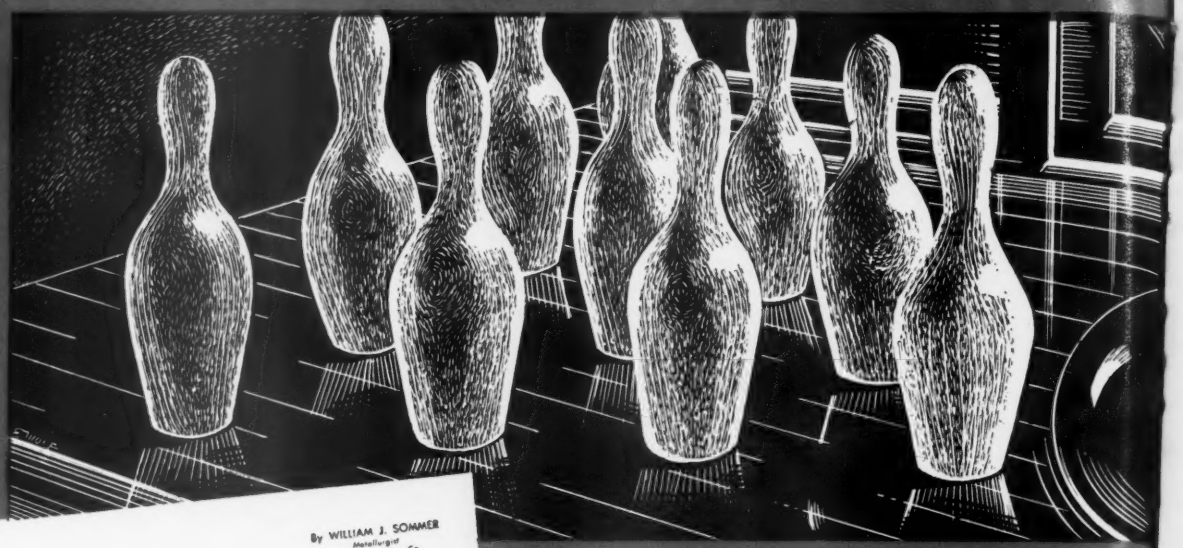
HERE is an idea useful in producing plaster corebox patterns. The greased core stick is placed on a lubricated plate, and a suitable wood frame is clamped together and set in position around the stick. A sharpened ⅛-in. rod is placed on top of the core stick as shown. Holding down on the rod for one minute after plaster is poured into the frame will prevent the core stick from floating.

When the plaster has set, the rod is withdrawn and the mold lifted from the plate. The nozzle of an air hose with pressure reduced to nearly zero is placed tightly against the ⅛-in. hole left by the rod and tiny jabs of air sent down the hole. The core stick will slip out with extreme ease.



Do you have any tricks of the trade tucked away with your foundry experience? Why not release them to fellow foundrymen? FOUNDRY will pay a minimum of $15 for each idea submitted and published. Send a photo or drawing with your idea

uniformity



By WILLIAM J. SOMMER
Metallurgist
Plainville Casting Co.
Plainville, Conn.

Quality Control:

IT'S IN THE REACH OF SMALL FOUNDRIES

Look at your inspection setup. If you're making chemical analyses, inspecting patterns, or castings, chances are you have basic elements needed to start quality control program

WITH THE foundry industry as a whole becoming more and more quality conscious and the larger companies setting up elaborate quality control programs, many smaller foundri... to

ing group are all too interested in getting the work out and meeting delivery dates. If possible by-pass your standards department or time study men. Their chief concern is getting rate of p... up and ...rd de-

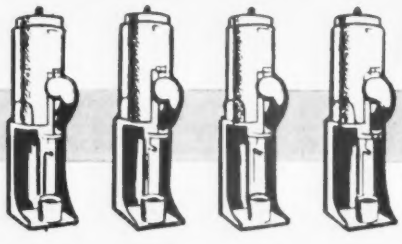
reason for the scrap. The type of scrap record you keep is optional, but it should contain such pertinent data as date, customer's name, pattern number, total cast... total scra... ...down of scra...

let uniform **DIXIE BOND** help you obtain *quality control*

Uniformity in materials all through the plant, — that is one big, indispensable aid toward the all-important end of quality control. Your molding sand must be uniform. For that uniformity you can depend upon Dixie Bond, produced under the strictest of laboratory control.

That isn't all. With Dixie you get also fast, easy shake-out; longer-lived flasks, more crack-less castings. You benefit from moderate dry and hot strength, the highest green strength known to the industry, high permeability, high flowability, and a high sintering point.

write for our new **DIXIE BOND** *bulletin*



ECP *laboratory control makes for uniformity*

In addition to our own laboratories, four in number, we carry on tests constantly at universities, research institutes and private laboratories. Quality is dependably uniform from car to car.

* DIXIE BOND

The strongest bond clay ever offered American Foundrymen. Moderate dry and hot strength mean easy shake-out and better flowability.

* TRIPLACT

Additive to core and molding sand; reduces scabbing, stops veins and fins in cores, improves finish; imparts higher flowability.

WESTONITE

Versatile chemically coated sand for green sand, skin-dried or dry sand molding. Maximum production, best finish, fewer types of sand needed.

* BLACK HILLS BENTONITE

Highest quality Wyoming bentonite of controlled uniformity. High green strength, high permeability, high dry and hot strength.

REVIVO FIRE CLAY, LAWCO FIRE CLAY, BONDACT FIRE CLAY

Found only in the Lawrence seam in Southern Ohio. Uniformly high refractory value. Use Revivo Fire Clay for highest plasticity, Lawco Fire Clay for general purposes and Bondact Fire Clay for mixes for gun emplacement.

ECP products satisfy a wide range of foundry needs

* *ECP Bond Clays and many combinations give you the one right answer for every purpose.*

CUPOLINE

Pre-mixed refractory for patching cupolas by air placement. Eliminates human equation. Produces uniform, dense patch of maximum slag resistance at lower cost.

* REVIVO

Strong, refractory, durable and economical. Unusually high colloidal content. Since 1923, the standard of comparison for refractory bond clays.

* BALANCED REVIVO

Extremely high dry and hot strength. Thermoplastic, gives toughness at high temperatures. Helps eliminate washing and scabbing.

DURA PRODUCTS

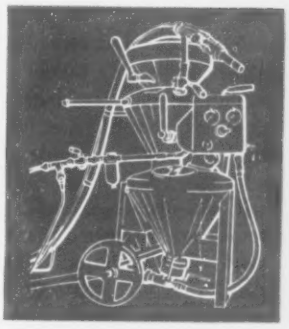
Plastic blow tubes, wear inserts and core box gaskets. Life many times that of metal. Cleaner, smoother cores, higher production, less maintenance.

* REVIVO CORE PASTE

Astonishing strength—35% to 300% stronger than competitive materials. It may be air-dried or oven-dried. Non-boiling.

BONDACTOR

For fast mechanical ramming of refractory linings and patches. Meters a dry refractory mix uniformly. Less bridging, longer heats, more tonnage, cleaner metal from Bondactor-patched cupolas. Saves hard manual labor and reduces costs. →



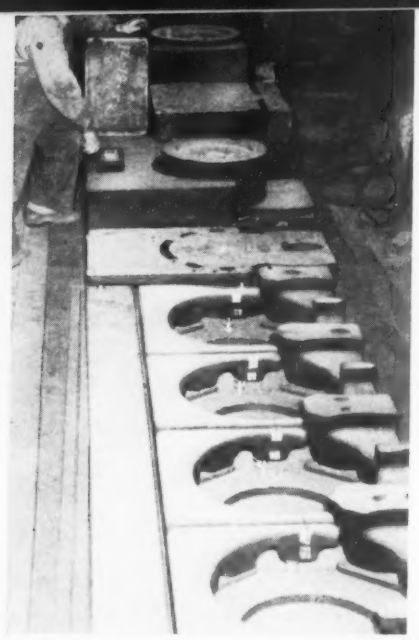
Minerals International Chemicals

EASTERN CLAY PRODUCTS DEPT.

INTERNATIONAL MINERALS & CHEMICAL CORPORATION

General Offices: 20 North Wacker Drive, Chicago, 6

DIXIE BOND • BLACK HILLS BENTONITE • TRIPLACT • REVIVO CORE PASTE • REVIVO BOND • BONDACTOR • CUPOLINE • DURA PRODUCTS • WESTONITE



ONE-PIECE CASTING

For Large Compressor Cylinder Block

FOUNDRY Division, Chambersburg Engineering Co., Chambersburg, Pa., is pouring the cylinder blocks portrayed in accompanying photos.

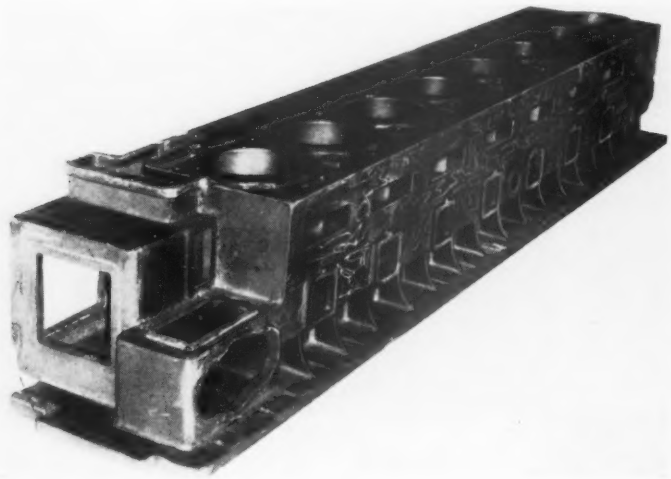
The blocks are used in a turbo-charged gas-engine driven compressor built by Clark Bros., Olean, N. Y.

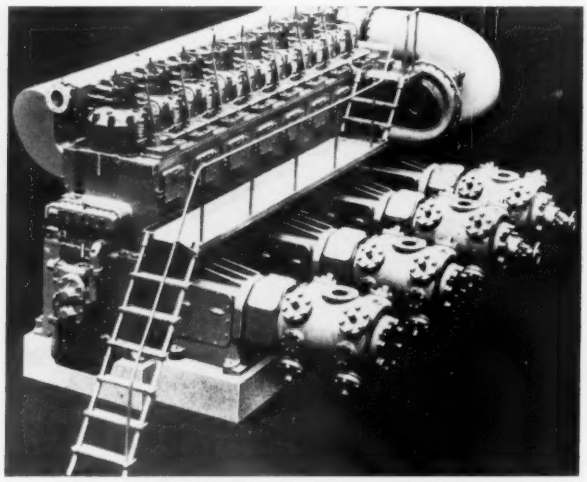
One piece construction is said to result in greater rigidity and permits built-in scavenger air headers and coolers, water headers, and oil filters.

The high duty iron casting is about 4 x 26 ft and was made in a cement bonded sand mold with over 100 cement bonded sand cores, under carefully engineered manufacturing control.

Left view depicts preparation of cement bonded sand mold and cores; view below left shows iron block following its preliminary cleaning

Shown below is the finished gas-driven turbo-charged compressor





(*Concluded from page* 189)

this size also are postwar installations, as likewise are 80 per cent of their 400 airless blast units, 88 per cent of their 1400 roller conveyors, 100 per cent of their 145 belt conveyors, 85 per cent of their 115 cupola chargers, and practically all of their 375 power trucks.

This survey also indicates the large number of foundries which have yet to mechanize such operations as sand and mold handling and mold shakeout. Mechanized sand handling systems are installed in about 28 per cent of all shops. The percentage ranges from approximately 90 per cent in the 450 largest plants down to only 15 or 20 per cent in the nearly 3900 smallest foundries. Incidentally, seven years ago only 16 per cent of all foundries had mechanized sand handling facilities.

Mold handling has been mechanized by 17 per cent of all foundries. Mechanical shakeouts are employed by about one foundry out of five.

Technical Progress Marked—Developments in foundry equipment and processes comprise only part of the industry's technical progress in recent years. Intensive study of casting fundamentals by individual companies and foundry organizations gradually is providing some of the answers to the age-old problem of how to make a sound product day in and day out. For example, we are learning more about what causes certain casting defects and how to eliminate the trouble. There is a better understanding of the type of molding sand and binder best suited for a particular job.

Study of the flow of liquid metal by such organizations as the American Foundrymen's Society, Steel Founders' Society of America and the Naval Research Laboratory has proved helpful in the design of more efficient gates, sprues and runners.

Greater application of quality control measures, improved testing technique through radiographic and other nondestructive methods, and more attention to the designing of parts so as to conform to sound casting practice—all have contributed to betterment in quality.

Ranking in importance with the necessity for acquiring still greater knowledge of how to control the variables in foundry operations is the problem of securing wider dissemination of what already is known. If all foundries today were to follow consistently the tried and proved practices which have been developed, the average quality of castings would be improved tremendously.

There is no question that the foundry of the future will be totally unlike the foundry of the past in many respects. It is equally evident that the principal distinguishing feature between plants of the two eras will be the increased application of engineering and scientific treatment to foundry problems. It follows, consequently, that the Foundry Educational Foundation is destined to play an important role in helping to give an impetus to this transformation during the years ahead.

Dear Reader:

This page has been provided for your convenience. Use one of the return cards attached for *more information* on advertisements in this issue.

FURTHER INFORMATION on any of the advertisements in this issue may be obtained by circling the page numbers of advertisements on one of the attached cards. Fill in your name and address, return your card to us—we'll forward your requests to the companies concerned. Further information on their advertisement will come direct to you from the advertiser. *Note: where more than one advertisement appears on a page, the following code is used for identification:* R (right); L (left); T (top); B (bottom); 1-2-3-4 (in order from top to bottom); IFC (inside front cover); IBC (inside back cover); OBC (outside back cover).

● For further information on helpful literature, trade publications, and new equipment descriptions, please refer to IDEAS FOR FOUNDRYMEN insert and return cards on page 211.

FOUNDRY Readers Service

FIRST CLASS
Permit No. 36
(Sec. 34.9 P.L.&R.)
Cleveland, Ohio

BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed in the United States

4c POSTAGE WILL BE PAID BY—

FOUNDRY
Penton Building
Cleveland 13, Ohio

Readers Service Dept.

JULY 1954

IFC	32	63	141	187	230	248	261BL
1	35	64	142	188	233	249	262L1
2	36	65	144	190-1	234T	250	262R1
4-5	37	66	145	196	234B	251	262-2
6-7	38	67	146	197	235R	252	262L3
8-9	39	68	149	199	235L	253	262R3
10	40	69	151	200	236	254	262-4
11	41	70	153	202-3	237R	255R	263T
12	42	71	155	205	237L	256L	263BR
13	43	72-73	156	207	238L	256TR	263L1
14	44	74	159	210	238R	256BR	263L2
15	45	75	160	215	239T	257T	264L
16-17	46-47	76	162-3	216	239B	257BR	264R1
18	48	109	164	218	240	257BL	264R2
19	49	111	165	219	241R	258T	264R3
20	50	113	167	221	241L	258BL	264R4
21	51	115	169	222	242T	258BR	265R
22	52	117	171	223	242B	259R	265TL
23	53	119	173	224T	243R	259TL	265BL
24	54	121	175-6	224B	243L	259BL	266T
25	55	123	179	225	244	260L	274
26	56-57	133	181	226	245	260R1	277
27	58	135	184-5	227	246T	260R2	278
28-29	59	136	186T	228	246B	261R	IBC
30	60-61	139	186B	229	247	261TL	OBC
31	62						

THIS CARD VALID FOR USE IN UNITED STATES AND CANADA ONLY

PLEASE SEND further information on the advertisements appearing on the pages which are circled above.

NAME

TITLE

COMPANY

ADDRESS

CITY & STATE

This card MUST be completely filled out. Please TYPE or PRINT

IFC	32	63	141	187	230	248	261BL
1	35	64	142	188	233	249	262L1
2	36	65	144	190-1	234T	250	262R1
4-5	37	66	145	196	234B	251	262-2
6-7	38	67	146	197	235R	252	262L3
8-9	39	68	149	199	235L	253	262R3
10	40	69	151	200	236	254	262-4
11	41	70	153	202-3	237R	255R	263T
12	42	71	155	205	237L	256L	263BR
13	43	72-73	156	207	238L	256TR	263L1
14	44	74	159	210	238R	256BR	263L2
15	45	75	160	215	239T	257T	264L
16-17	46-47	76	162-3	216	239B	257BR	264R1
18	48	109	164	218	240	257BL	264R2
19	49	111	165	219	241R	258T	264R3
20	50	113	167	221	241L	258BL	264R4
21	51	115	169	222	242T	258BR	265R
22	52	117	171	223	242B	259R	265TL
23	53	119	173	224T	243R	259TL	265BL
24	54	121	175-6	224B	243L	259BL	266T
25	55	123	179	225	244	260L	274
26	56-57	133	181	226	245	260R1	277
27	58	135	184-5	227	246T	260R2	278
28-29	59	136	186T	228	246B	261R	IBC
30	60-61	139	186B	229	247	261TL	OBC
31	62						

THIS CARD VALID FOR USE IN UNITED STATES AND CANADA ONLY

PLEASE SEND further information on the advertisements appearing on the pages which are circled above.

NAME

TITLE

COMPANY

ADDRESS

CITY & STATE

This card MUST be completely filled out. Please TYPE or PRINT

FIRST CLASS
Permit No. 36
(Sec. 34.9 P.L.&R.)
Cleveland, Ohio

BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed in the United States

4c POSTAGE WILL BE PAID BY—

FOUNDRY
Penton Building
Cleveland 13, Ohio

Readers Service Dept.

Dear Reader:

This page has been provided for your convenience. Use one of the return cards attached for more *information* on advertisements in this issue.

FURTHER INFORMATION on any of the advertisements in this issue may be obtained by circling the page numbers of advertisements on one of the attached cards. Fill in your name and address, return your card to us—we'll forward your requests to the companies concerned. Further information on their advertisement will come direct to you from the advertiser. *Note: where more than one advertisement appears on a page, the following code is used for identification:* R (right); L (left); T (top); B (bottom); 1-2-3-4 (in order from top to bottom); IFC (inside front cover); IBC (inside back cover); OBC (outside back cover).

• For further information on helpful literature, trade publications, and new equipment descriptions, please refer to IDEAS FOR FOUNDRYMEN insert and return cards on page 211.

FOUNDRY Readers Service

ACTIVITIES OF FOUNDRY GROUPS

NORTHWESTERN PENNSYLVANIA Chapter of the AFS met in May to elect officers and honor two of its members who won honors at the AFS Convention and Exhibit. In photo at left, Earl M. Strick, Erie Malleable Iron Co., left, and Thomas E. Eagan, Cooper-Bessemer Co., Grove City, Pa., right, are shown holding desk sets with attached barometers, gifts of the chapter and presented by Frank Volgstadt, Griswold Mfg. Co., center. In the photo at right, left to right, are Jacob Diemert, Erie Castings Co., and Bailey Herrington, Hickman, Williams & Co., new vice chairman and chairman, respectively

Northwestern Pennsylvania

ABOUT 150 members of Northwestern Pennsylvania Chapter of the AFS met in May at Erie, Pa., to elect officers for 1954-55 and honor two members who brought recognition to themselves and to the chapter at the recent AFS Convention and Exhibit.

Thomas E. Eagan, Cooper-Bessemer Corp., who received the Joseph A. Seaman Medal for outstanding work on engineering data on production and utilization of alloy cast irons, and Earl M. Strick, Erie Malleable Iron Co., who received an honorary AFS life membership for outstanding work in the development and encouragement of foundry interest at the high school and trade school level, were presented gold desk sets with barometers attached. Frank Volgstadt, Griswold Mfg. Co., made the presentation.

Election results were: Bailey D. Herrington, Hickman, Williams & Co., chairman; Jacob Diemert, Erie Castings Co., vice chairman; Robert L. Johnson, Bucyrus-Erie Co., secretary; Richard C. Strong, Griswold Mfg. Co., treasurer.

Directors to serve for one year are Charles Gottschalk, Cascade Foundry Co., Duane L. Keep, K & L Refractories Co., Robert W. Jordon, Ajax Iron Works, Corry, Pa., and E. J. Bonesteel, General Electric Co. Directors for two years are William Eccles, Cooper-Bessemer Corp., Roy A. Loder, Erie Malleable Iron Co., and Robert A. Erskine, Bucyrus-Erie Co. Directors for three years are Walter Yohn Jr., American Sterilizer Co., and Paul W. Green, General Electric Co.

Following the election, a film "Technique for Tomorrow," portraying operations at the Cleveland Ford Foundry, was shown.—*Roy A. Loder, Erie Malleable Iron Co.*

San Antonio Section

FORTY members and guests of San Antonio section of the AFS Texas Chapter met at the Alamo Iron Works May 24 to view a safety film and hear a talk on the use of "Silicones in the Foundry" presented by Mr. Guin, Linde Air Products Co., Houston, Tex. Refreshments were supplied by F. & J. Pattern Works. —*E. W. Pruske, Alamo Iron Works.*

St. Louis

NEARLY 100 members and guests attended the May 20 meeting of St. Louis Chapter of the AFS. This final gathering of 1953-54 was the annual business and installation of officers meeting.

Guest speaker was John H. Harwood, personnel director, Metal Goods Corp., St. Louis, whose talk, "Effectively Working With People," stressed the importance of cultivating the proper attitudes among fellow workers and the need for giving these individuals a feeling of personal dignity. Proper attitudes are important because employee attitudes affect morale and morale affects production. Mr. Harwood feels that one of the important ways to create a healthy attitude is to maintain a close personal relation between the worker and his supervisor. To do this, the supervisor must take a serious interest in each person.

Newly elected officers for 1954-55 are Fred J. Boeneker, Bronze Alloys Co., chairman; George L. Mitsch, American Car & Foundry Co., vice chairman; Russell E. Hard, St. Louis Coke & Foundry Supply Co., treasurer, and Paul E. Retzlaff, Nordberg Mfg. Co., secretary. Directors are Webb L. Kammerer, Midvale Mining & Mfg. Co., Arthur O'Hare, O'Hare's Foundry Co., Fred C. Hatten, Century Electric Co., and Jack Bodine, Bodine Pattern & Foundry Co.

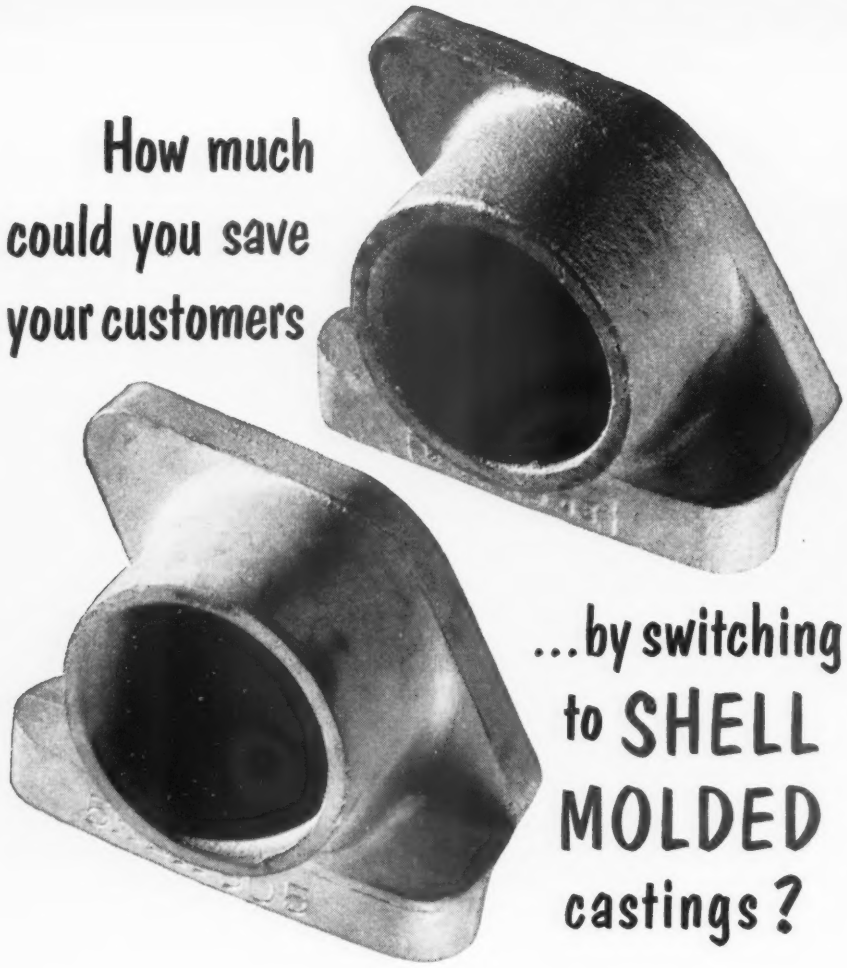
A film on the Cleveland Ford Foundry, "Technique for Tomorrow," was shown following the business meeting and technical program.

The first spring dinner dance was held May 1 at Norwood Country Club and 226 guests enjoyed dinner and dancing. The affair was so well received that indications are it will become an annual event. The chapter's annual picnic will be held Aug. 7 at Maple Grove, Mo.—*Jack Bodine, Bodine Pattern & Foundry Co.*

Metropolitan Brass

BUILDING Trades Employer's Club, New York, was the setting June 8 for 16 members of the Metropolitan Brass Founders' Association who gathered for the final meeting of the 1953-54 season.

Members of the group who attended the AFS convention and exhibit in Cleveland presented interesting reports on the convention and answered questions. A 30-minute



Many factors, including shape, size, metal, and number of castings required, all have a bearing on the economies possible with shell molding. These vary with the nature of the individual job.

Certain economies are basic, however. They are apparent in the contrast between these two typical castings, the lower being from green sand, the other shell molded. The almost pattern-smooth surfaces of the shell molded piece, the fine detail and clean, sharp edges result in substantial savings in machining and finishing. Often these costly operations are eliminated entirely!

Continuing research on a practical scale in connection with Durez foundry resins has produced a fund of information that can help to answer questions in advance. We will gladly share the results of our experience with you. Just write, telling us all you can about what you wish to know.

- Less Machining
- Fewer Rejects
- Smoother Surfaces

say buyers of castings

DUREZ

PHENOLIC RESINS

MOLDING COMPOUNDS
INDUSTRIAL RESINS
PROTECTIVE COATING RESINS

Specialists for 33 years in developing phenolic resins and plastics to meet the needs of industry.

DUREZ PLASTICS & CHEMICALS, INC.
1007 Walck Road, North Tonawanda, N. Y.

Phenolic Resins for the New Competitive Era

film, "Chaplets," distributed through the Fanner Mfg. Co., Cleveland, was shown portraying chaplets in use in casting automobile blocks, cylinder heads, steam boilers, steam radiators, locomotives, railroad equipment, and gas burners.—*George Staub.*

Ontario

GENERAL Brock Hotel, Niagara Falls, Ontario, was the scene Mar. 26 of the regular meeting of the Ontario Chapter of the AFS. Plants open for visitation were Canadian Carborundum Co., Niagara Falls, and Canadian Furnace Ltd., Port Colbourne. H. Mabson, chief inspector, Industrial Accident Prevention Association, was guest speaker. His talk was entitled "How Health and Hygiene Affect Foundry Costs." L. "Bern" Morris, Standard Sanitary & Dominion Radiator Ltd., introduced the speaker.

After pointing out that the humanitarian aspect of safety is praiseworthy, Mr. Mabson went on to show that the economic angle is well worth serious consideration. Mr. Mabson presented some alarming statistics on claims, lost time, disabilities, costs of medical attention, and value of lost production. Using 5 per cent as an arbitrary profit margin, the foundry industry of Ontario must do $8 million worth of business before one cent of profit is realized, because in Ontario costs of workmen's compensation are paid for by all industry, prorated as to severity and risk, and these costs must be met before a profit is realized.

Mr. Mabson closed his remarks by emphasizing the need for teaching safe practices to all employees, new and old, and cautioned against older employees becoming careless through constant association with the dangers of their occupation.—*Wm. H. L. Bryce, International Harvester Co. of Canada.*

Reading

READING Foundrymen's Association met May 18 at Berkshire Hotel, Reading, Pa., to elect officers for the coming year. James Woodward, president, Dick Bros. Inc., was re-elected president. Others elected are: Vice president, James H. Stewart, executive vice president, Reading Gray Iron Castings Inc., and treasurer, Paul K. Reiniger, general foreman, Textile Machine Works.

Members elected to the executive committee include Howard E. Edsall, plant superintendent, Birdsboro Armorcast Inc.; Paul B. Harner, secretary-treasurer, Union Mfg. Co.; Daniel R. Heckman, foundry foreman, Empire Steel Castings Inc.; Paul C.

Holland, foundry supervisor, Beryllium Corp.; George C. Kissell, president, Fairmount Foundry Inc.; Robert M. Schumo, general manager, Pennsylvania Electric Steel Casting Co., and John W. Swengel, foundry superintendent, American Chain & Cable Co.

Following election of officers, three panel discussions were held. Mr. Heckman was technical chairman for the steel discussion session while Edwin A. Zebb, Dodge Steel Co., Philadelphia, was discussion leader. George C. Kissell was technical chairman for the iron discussion group and Fred G. Sefing, International Nickel Co., New York, was the discussion leader. David Tamor was in charge of the brass and bronze discussion and William H. Baer, Navy Department, Washington, was discussion leader.—*William I. Cassidy.*

Cleveland Non-Ferrous

ELECTION of officers for the next chapter year was held at the Apr. 22 meeting of Cleveland Chapter of the Non-Ferrous Founders' Society at the Belmont Hotel. A. E. Schauer, Schauer Bronze & Aluminum Foundry Co., Cleveland, was elected chairman; B. E. Weimer, Wellman Bronze & Aluminum Co., Cleveland is vice chairman; W. O. Larson Jr., Grafton Foundry Co., Grafton, O., was re-elected secretary and D. B. Kennedy, Gluntz Brass & Aluminum Foundry Co., was re-elected treasurer.

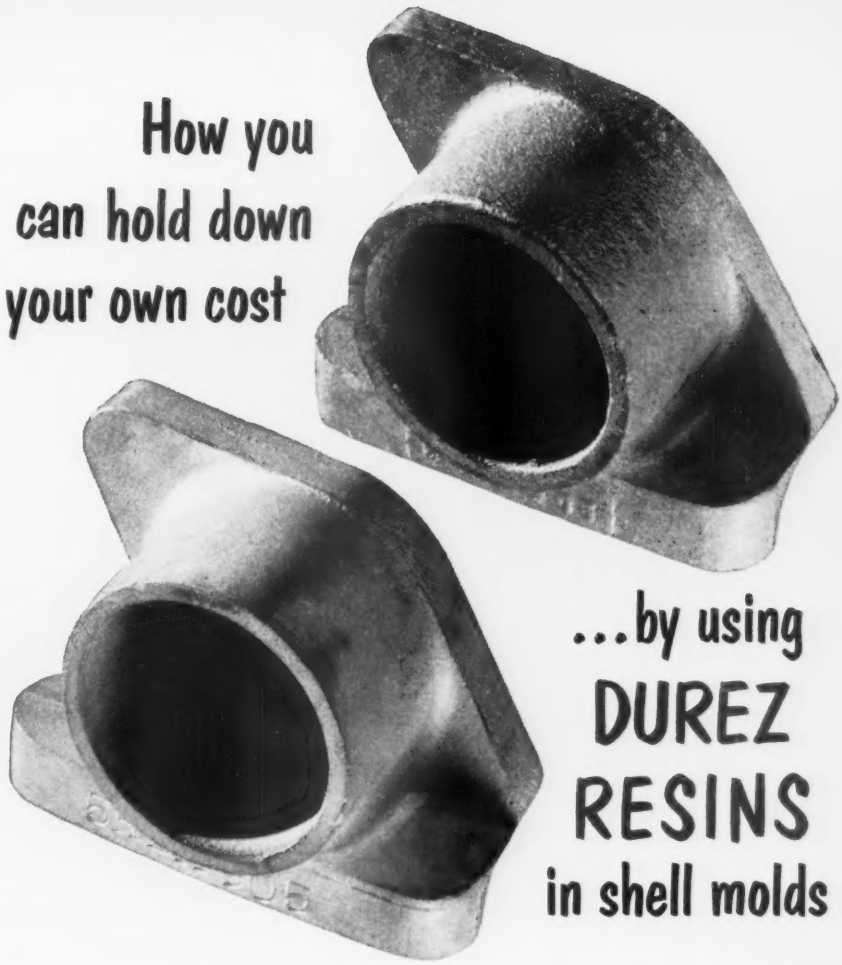
The group then discussed general business conditions, wage negotiations and the outlook for the future. —*Walter O. Larson Jr., Grafton Foundry Co.*

Northeastern Ohio

APPROXIMATELY 200 members and guests of Northeastern Ohio Chapter of the AFS, including nine past presidents and 33 old timers, met in Cleveland May 20 to elect new officers and enjoy a program of professional entertainment in ending the regular monthly meetings for 1953-54.

New officers, whose terms begin July 1, are David Clark Jr., Forest City Foundries Co., chairman; Lewis T. Crosby, Sterling Wheelbarrow Co., first vice chairman; Alexander D. Barczak, Superior Foundry Inc., second vice chairman; Harold R. Strater, North American Refractories Co., treasurer, and Howard E. Heyl, Federal Foundry Supply Co., secretary.

Stephen E. Kelly, immediate past chairman, was elected to a one-year term on the board of directors, as was Charles F. Walton, Gray Iron Founders' Society. New directors for three years are: Emil J. Romans, National Malleable & Steel Castings Co.;



How you can hold down your own cost

...by using DUREZ RESINS in shell molds

Cost savings in the foundry, too, depend in part on the nature of the job. But here, use of Durez shell mold resins helps to assure maximum benefit from major advantages of the process.

You can save time on runs of any length with a Durez resin of exceptionally fast cure and rigid set. Many foundries prefer this resin for those tough, hard warp-free shells that hold rejects to an absolute minimum when exceptionally fine castings are required. Unusually fine detail means less clean-up, more good castings per ton of metal poured.

You get the advantages of dealing with specialists when you start with Durez. We have resins to fit varying foundry requirements, and our experience with shell mold problems is always at your service. Call on us freely for cooperation in achieving the results you want.

Made by America's largest producer of phenolic plastics exclusively.

DUREZ PLASTICS & CHEMICALS, INC.
1007 Walck Road, North Tonawanda, N. Y.

HERE'S HELPFUL READING!

DUREZ PLASTICS & CHEMICALS, INC.
1007 Walck Road, North Tonawanda, N. Y.

Put me on your list for "Shell Molding News."

Name .....
Company .....
Address .....
City and State .....

SHELL MOLD RESINS THAT FIT THE JOB

TWIN CITY Chapter of the AFS met May 18 to install officers, discuss the AFS Convention and Exhibit, and honor winners in the apprentice contests. In upper photograph, left to right, are C. Fred Quest, J. F. Quest Foundry Co., Minneapolis, and H. H. Blosjo, Minneapolis Electric Steel Castings Co., Minneapolis, who participated in panel discussion of the AFS Convention. Other members of panel are shown in the lower photo. Left to right, Nate Levinsohn, Minneapolis-Moline Co., Minneapolis, O. J. Myers, Archer-Daniels-Midland Co., Minneapolis, and A. W. Johnson, Northern Malleable Iron Co., St. Paul, panel moderator and chairman of the Twin City chapter. Photos by R. J. Mulligan, Archer-Daniels-Midland Co.

Wayne C. Johnson, Walter Best Inc.; John Davenport, Fulton Foundry & Machine Co.; E. R. Crosby, Smith Facing & Supply Co., and Albert S. Johnson, Lake City Malleable.

Walter E. Sicha, Research Division, Aluminum Co. of America, and Leroy P. Robinson, Archer-Daniels-Midland Co., former chapter presidents and recipients of the William H. McFadden Medal and life membership in the AFS, respectively, at the recent AFS convention and exhibit, were introduced.—*Kenneth L. Mountain.*

CENTRAL ILLINOIS Chapter of the AFS heard a talk by Howard H. Wilder, manager, Iron Foundry Division, Vanadium Corp. of America, Detroit, at its May meeting. In the photo, left to right, are Mr. Wilder, Philip Burchell, Pekin Foundry & Mfg. Co., Pekin, Ill., technical chairman of the meeting, F. S. Frost and W. S. Macy, American Foundry & Furnace Co., Bloomington, Ill.

Twin City

INSTALLATION of officers for 1954-55, announcement of local apprentice contest winners and a discussion of the AFS convention in Cleveland marked the May 18 meeting of Twin City Chapter of the AFS. Newly installed officers are A. W. Johnson, Northern Malleable Iron Co., chairman, and H. H. Blosjo, Minneapolis Electric Steel Castings Co., vice chairman. Edward Sitarz, Prospect Foundry Co., J. J. Uppgren, Northern Ordnance Inc., and R. M. Ovestrud, all of Minneapolis-Moline Co., were elected to three-year terms as directors.

Winners of the apprentice contest, judged prior to the Cleveland convention, were G. Degler Jr., patternmaker, American Hoist & Derrick Co., and J. Ward, molder, Brom Machine & Foundry Co.

A panel of H. H. Blosjo and C. Fred Quest, J. F. Quest Foundry Co.; O. Jay Myers, Archer-Daniels-Midland Co., and Nate Levinsohn, Minneapolis-Moline Co., highlighted the recent AFS convention by discussing individual impressions of the exhibits and technical sessions. A. W. Johnson moderated the roundtable discussion.

The annual golf outing and banquet will be held Aug. 2 at Midland Hills Country Club with J. S. Garske, Progress Pattern & Supply Co., in charge of arrangements. — *R. J. Mulligan, Archer-Daniels-Midland Co.*

New England

NEW England Foundrymen's Association met Mar. 10 to hear a talk by Thomas E. Barlow, sales manager, Eastern Clay Products Department, International Minerals & Chemical Corp., Chicago. His talk on "Pressure Molding" was enlightening and was demonstrated by slides. A lengthy question period followed the presentation.

The chapter met Apr. 14 to listen to James R. Bright, lecturer at the Graduate School of Business Administration, Harvard University, speak on the subject of "Material Handling in the Foundry." He talked about different methods of eliminating waste motion in making cores and molds and followed this discussion with slides of various types of cranes and other means of mechanization in foundries.—*Alexander Beck, Whitman Foundry Inc.*

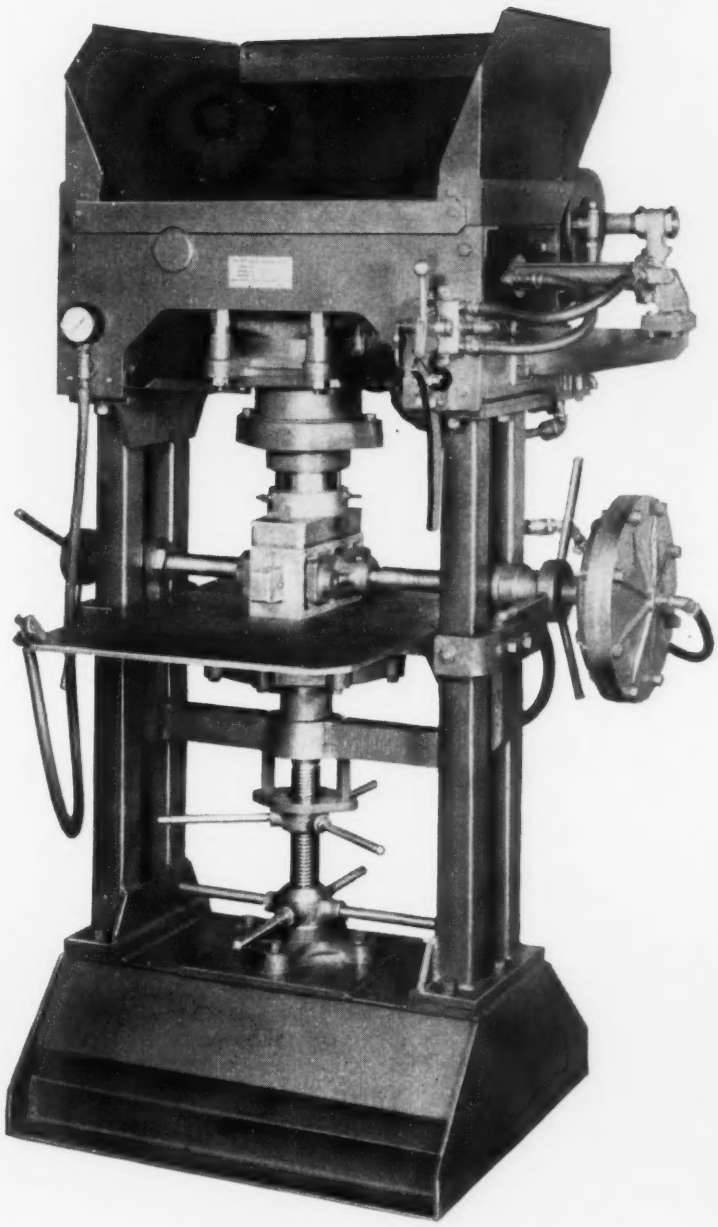
Eastern New York

ANNUAL joint meeting of the Eastern New York Chapter of the AFS and the district chapter of

(*Continued on page* 201)

Redford NO. 4

CORE BLOWER



Designed to add more power, capacity and speed to traditional Redford simplicity, flexibility and convenience, the No. 4 Redford superbly fills the need for a truly fast and flexible machine to blow cores from a few ounces to 10 lbs.

There is no need for the operator to wait for the machine at any time—the fast operating cycle permits immediate release of the core box after the cores have been blown.

Exhaust air is utilized to thoroughly fluff the sand remaining in the sand magazine after each blow, thus reducing the possibility of cratering.

Magazine heads normally furnished with the No. 2 Redford machine can be used with the No. 4 Redford. Larger new type magazine heads are also available as standard equipment.

A completely new fully adjustable clamp for vertically parted core boxes simplifies core box set up—when not needed the clamp units can be adjusted all the way out or completely taken off the machine.

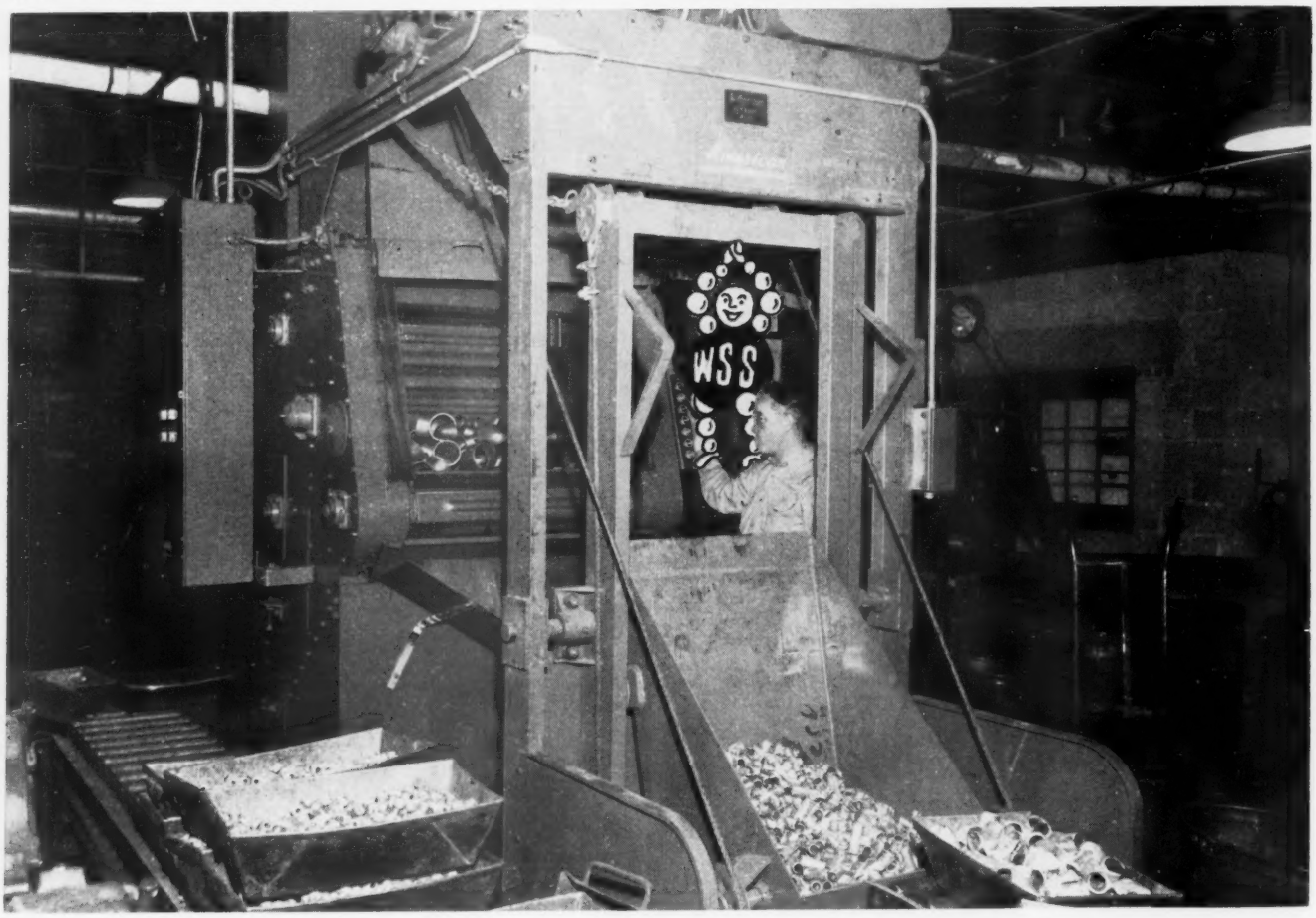
Redford No. 4 users report production up to 8 boxes per minute using only one core box per machine. To get complete information write for Specification Bulletin 4.

Cores at right illustrate wide range of work that can be done with the Redford No. 4 Core Blower.

Redford IRON & EQUIPMENT CO.

20733 GLENDALE AVENUE • Phone KEnwood 1-8611 • DETROIT 23, MICHIGAN

pioneering developments keep WHEELABRATOR® STEEL SHOT first in abrasives



Wheelabrator® Steel Shot Wins on Every Count

Provides Lowest Overall Costs For Every Foundry Cleaning Operation

Wheelabrator Steel Shot cuts cleaning costs 56% over malleable iron shot at Swayne, Robinson & Co.

Slashes maintenance costs 70% over annealed iron shot at Gunite Foundries Corp.

Cuts abrasive costs 30% over malleable iron and another cast steel shot at Woodruff & Edwards, Inc.

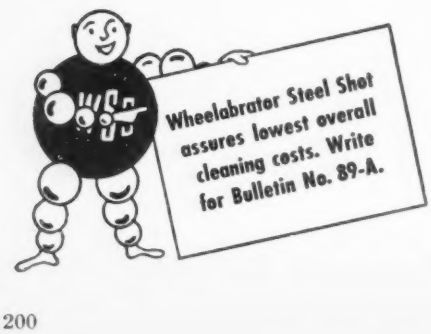
Slashes abrasive costs 50-60% over malleable iron shot at Unicast Corp.

Competitive abrasive tests made by these users and hundreds of others all ended in just one way! "On every count Wheelabrator Steel Shot is the best abrasive buy." These users have switched to this superior electric furnace steel shot, and are continuing its use, because of the many savings it is effecting in their operations —in abrasive consumption, increased production and decreased maintenance.

Combining hardness with toughness, Wheelabrator Steel Shot will clean or peen faster, at lower costs, than any other abrasive. Try it and prove it for yourself.

PLUS

50 lb. cartons and palletizing. A Scheduled Delivery Plan.



American
WHEELABRATOR & EQUIPMENT CORP.
505 S. Byrkit St., Mishawaka, Indiana

WHEELABRATOR STEEL SHOT

(*Continued from page* 198)

the American Society for Metals was held recently in Menands, N. Y. Prof. Howard F. Taylor, Massachusetts Institute of Technology, Cambridge, Mass., was the speaker and presented data evolved from his MIT Foundry Research Group on the subject of risering and feeding of castings. He reviewed heat transfer conditions surrounding the solidification of castings and risers and convincingly accentuated the importance of radiation losses in materials poured at high temperatures. A theoretical analysis of radiation versus convection losses indicated a surprisingly high loss in riser efficiency when top protection is inadequate.

Mr. Taylor devoted the second half of his discussion to the use of exothermic mold materials and demonstrated their potential in feeding applications. The recurrent theme of the evening's discussion was an expression by Mr. Taylor that he felt foundry products could be made better.—*S. A. Eliot, General Electric Co.*

Central Michigan

ONE of the largest turnouts of the year of the Central Michigan Chapter of the AFS assembled Apr. 21 at the Hart Hotel, Battle Creek, Mich., to hear a discussion of the ADM-Dietert process. Frank Brewster, vice president, Harry W. Dietert Co., Detroit, and Warner B. Bishop, sales manager, Foundry Products Division, Archer-Daniels-Midland Co., Cleveland, were speakers. In discussing the process, it was emphasized that careful consideration should be given before attempting this or any of the other precision processes.

The nominating committee presented the following names for consideration for next year's officers: Chairman, Lachlan Currie, Gale Mfg. Co., Albion, Mich.; vice chairman, Gardner Lloyd, Albion Malleable Iron Co., Albion, Mich.; secretary-treasurer, Gerald Strong, Homer Foundry Corp., Coldwater, Mich.; director for two years, Alden Hensel, Albion Malleable Iron Co., Albion, Mich.; directors for three years, Charles Rowley, E. W. Bliss Co., Hastings, Mich., Harry Sprecken Jr., Sturgis Foundry Co., Sturgis, Mich., and Robert D. Dodge, Archer-Daniels-Midland Co., Detroit.—*Bob Dodge, Archer-Daniels-Midland Co.*

Pittsburgh

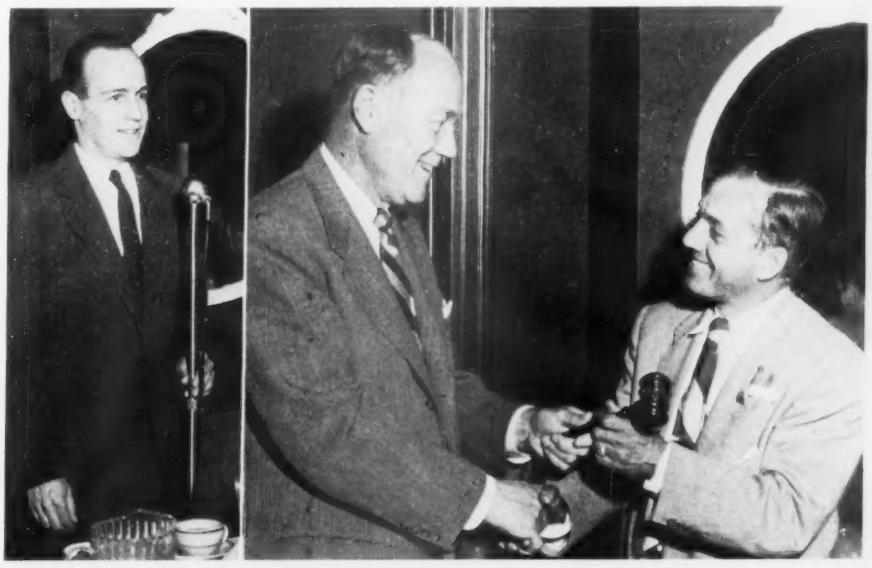
MORE than 130 members of the Pittsburgh Foundrymen's Association gathered at Webster Hall Hotel for the Apr. 19 meeting. Subject was the Dietert process of producing shell molds. D. E. Cutler introduced Frank Brewster, vice president and general manager, Harry W. Dietert Co., Detroit, who outlined the method.

Mr. Brewster pointed out that demand for precision castings has grown steadily and now constitutes a promising market. He added that customers want more exact castings with better finish.

"We don't expect that foundries could furnish exact castings at the same cost as other castings. Precision methods require more care," Mr. Brewster said. Included among the several methods now available which provide better tolerances required for small parts such as those required in refrigerators and guns, is the Dietert method. With slides to illustrate, Mr. Brewster stated that by using ordinary foundry equipment the process improves accuracy of castings by providing firm support and pressure on the shell at impo - tant points of the mold. Blowholes ½-in. wide are placed every 4 in. and vents every 2 in. Little or no

(*Continued on page* 204)

WESTERN MICHIGAN Chapter of the AFS held its May meeting at the Cottage Inn, Muskegon, Mich. Left to right are C. H. Cousineau, Carpenter Bros. Inc., technical chairman, W. J. Cannon, Nugent Sand Co., Joseph S. Schumacher, Hill & Griffiths Co., speaker for the meeting, G. W. Bartlett, Neway Equipment Co., chapter vice chairman, F. J. DeHudy, Centrifugal Foundry Co., chapter director, and J. A. Van Haver, Sealed Power Corp., chapter chairman



ST. LOUIS Chapter of the AFS featured a varied program at the May 20 meeting, electing officers, viewing a movie, and hearing a speech by John H. Harwood, personnel director, Metal Goods Corp., on "Effectively Working With People." In photo at left, Mr. Harwood is seen at the microphone. In photo at right, Webb L. Kammerer, left, Midvale Mining & Mfg. Co., immediate past chapter chairman, turns over the gavel to newly elected chairman Fred J. Boeneker, Bronze Alloys Co. Photos by Jack Bodine, Bodine Pattern & Foundry Co.

Let's talk sense about t

FOR AUTOMATION OR MODERNIZATION . . . YOU NEED MOLDING MACHINES DESIGNED TO HANDLE VARYING PRODUCTION REQUIREMENTS

THE problem of achieving greater economy and efficiency in the face of rising costs must be met by every foundry according to its specific requirements. For some, the answer lies in *automation* . . . the use of fully automatic machinery and systems which can operate with minimum supervision and human effort. For others, whose plant size and production volume do not permit the use of complex coördinated equipment, the solution is *modernization* . . . the replacement of obsolete models with improved machines engineered for efficient low-cost operation.

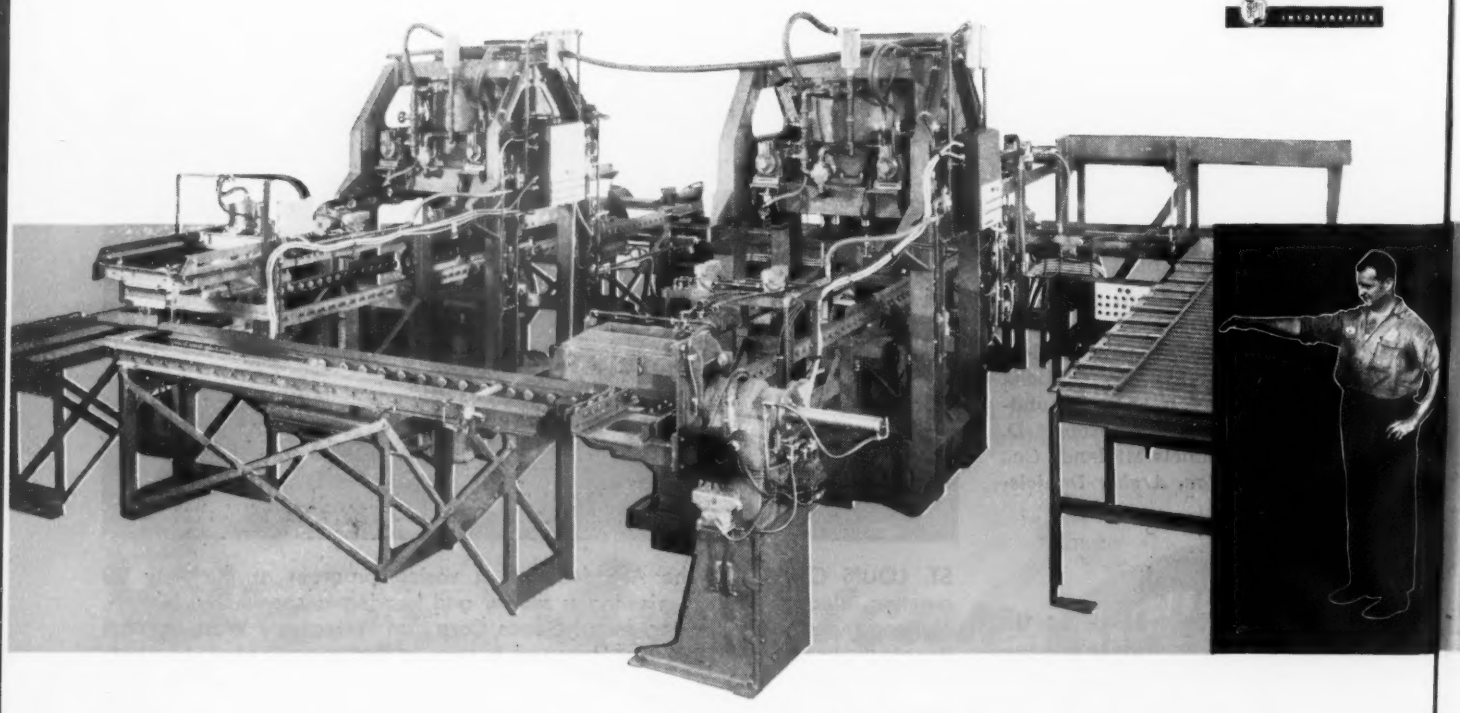
Whether your foundry is ready for automation or a modernization of its existing facilities, SPO builds the molding machines you need for higher production at lower cost.

. . . IF YOU'RE READY FOR COMPLETELY AUTOMATIC MOLDING

As the first practical automatic molding unit, the SPOMATIC has made complete automation possible in the foundry. This unit provides the most efficient, economical and high-speed method of "hands-off" production molding available today. Once a SPOMATIC is started, all operations are fully automatic, mechanical and continuous.

All SPOMATIC installations are engineered to individual production requirements. Capacities of the various integral components can be widely varied. In addition, each machine's versatility is controlled by the flask size specified and the variety of molds possible within that size.

SPOMATIC is the trend-setting molding machine designed to bring automation to foundry operations . . . to make the "foundry of the future" a reality today! Write for Bulletin "MM" for additional details.



From the smallest to the largest . . . there's a SPO for every molding job

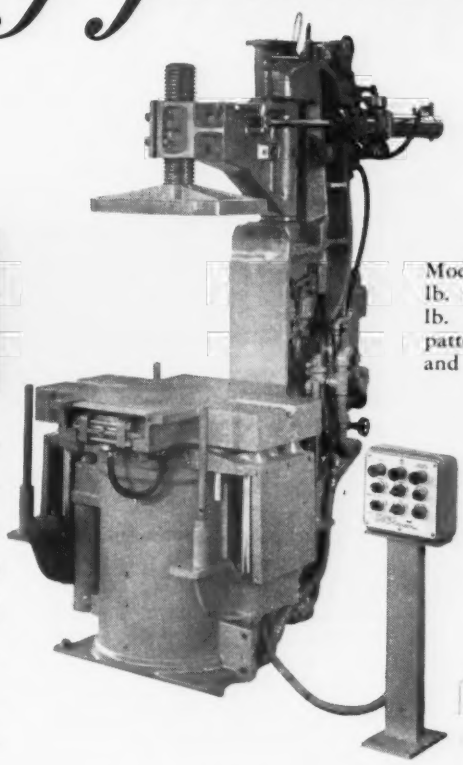
SPO

the changing foundry

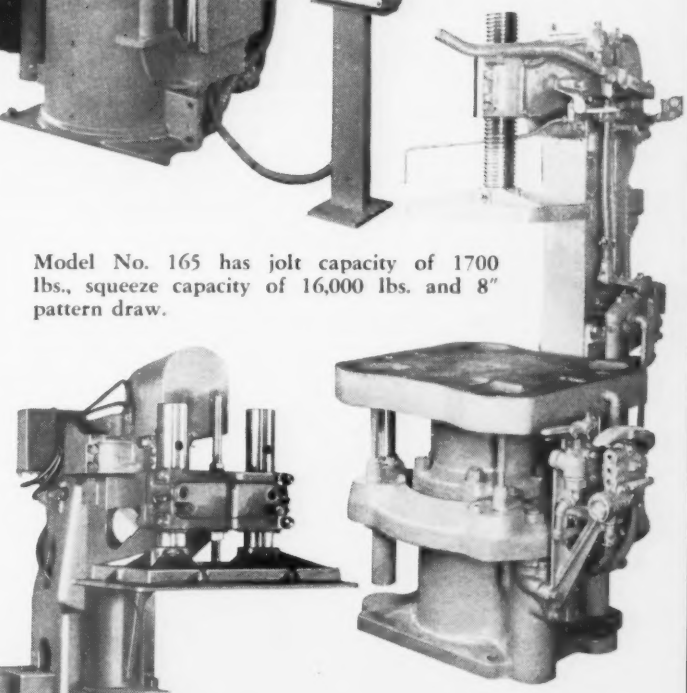
. . . IF YOU'RE GOING TO IMPROVE EXISTING FACILITIES

SPO produces a complete line of molding machines to meet every foundry's needs . . . both for jobbing and mass-production operations. Ranging from small manually-operated units to semi-automatic pushbutton giants, SPO machines are engineered for safe, economical, high speed operation and the production of uniform standard molds. Most of these versatile machines feature the patented "inverted jolt" mechanism, which assures maximum efficiency and service life with minimum maintenance. All SPO units are shipped complete with necessary valves, controls and lubrication fittings. Only an air line need be attached for operation. To meet individual needs, a variety of accessory items also can be supplied for many types of SPO machines.

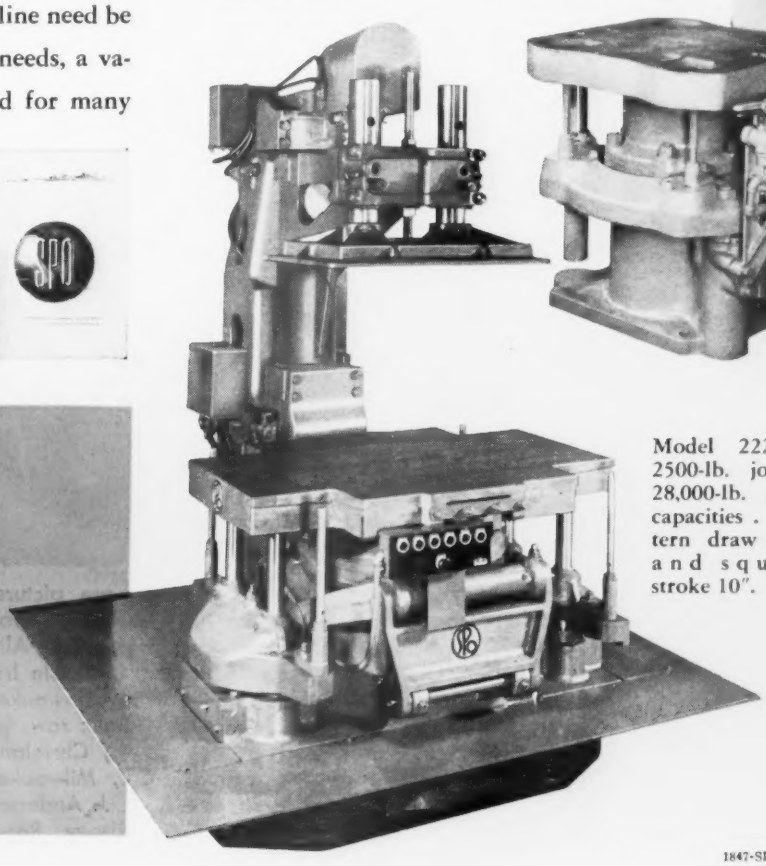
The SPO molding machines illustrated on this page are only a few examples of types and sizes available today. Write for new 8-page bulletin for additional details.



Model 2160-C has 1500-lb. jolt capacity, 16,000-lb. squeeze, adjustable pattern draw (6 to 10") and 12" squeeze stroke.



Model No. 165 has jolt capacity of 1700 lbs., squeeze capacity of 16,000 lbs. and 8" pattern draw.



Model 2222 has 2500-lb. jolt and 28,000-lb. squeeze capacities . . . pattern draw is 12" and squeeze stroke 10".

1847-SI

SPO INCORPORATED 6449 GRAND DIVISION AVE. • CLEVELAND 25, OHIO

MICHIGAN STATE COLLEGE Chapter of the AFS met in April to hear a talk by Collins Carter, president, Albion Malleable Iron Co., Albion, Mich. and immediate past president of the AFS. Left to right are Richard Dobbins, sales representative, Albion Malleable Iron Co., Louie Bachinski, Albion Malleable Iron Co., Bruce Harding, chairman, Michigan State College Chapter of AFS, Mr. Carter, Fred Hodson, secretary-treasurer, MSC Chapter, Al Hensel, personnel director, and Bruce Allen, sales department, Albion Malleable Iron Co.

(*Continued from page* 201)

wear is made on the pattern as blowing is always past the pattern and never at the pattern. Blowholes are rubber lined, and venting material can be porous metal.

Simplest sand mixture consists of fine sand and 2½ per cent Dietert-process oil. In cases of too much stickiness, additions of iron oxide or fly ash were suggested.

As for the results, Mr. Brewster concluded, "There are castings made in this process which are held to 0.005-in. tolerance along the parting line."

PAST PRESIDENTS of the Wisconsin Chapter of the AFS are pictured as they assembled at the recent AFS convention in Cleveland. Front row, left to right: A. F. Pfeiffer, Allis-Chalmers Mfg. Co., West Allis, Wis.; B. D. Claffey, Dayton, O., W. J. MacNeill, Badger Malleable Iron Co., South Milwaukee, Wis., G. E. Tisdale, Zenith Foundry Co., Milwaukee, and Walter Gerlinger, Walter Gerlinger Inc., Milwaukee. Back row, left to right: G. K. Dreher, Steel Founders' Society of America, Cleveland; W. W. Edens, Badger Brass and Aluminum Foundry Co., Milwaukee, John Bing, Metropolitan Refractories Corp., Kearny, N. J., R. J. Anderson, Belle City Malleable Iron Co., Racine, Wis., and J. G. Risney, Risney Foundry Equipment Co., Brookfield, Wis. Photograph is through the courtesy of John Bing, Metropolitan Refractories Corp.

The closing business meeting of 1953-54 of the Pittsburgh Foundrymen's Association was held May 17 at Webster Hall Hotel, Pittsburgh. About 120 members were present to hear Dr. R. E. Savage, Research and Development Division, International Nickel Co., speak on new developments in ductile iron.

Dr. Savage described ductile iron as a new engineering material now accepted by industry and government for many applications and being produced by more than 100 companies in the United States and an additional 150 firms in other countries.

Newly elected officers for 1954-55 are R. H. English, chief metallurgist, National Alloy Division, Blaw-Knox Co., president; H. C. Stirling, general plant superintendent, Pittsburgh Rolls Division, Blaw-Knox Co., vice president; E. P. Buchanan, sales manager, Pittsburgh Coke & Chemical Co., re-elected secretary-treasurer.

Members elected to the executive committee are the chapter's immediate past chairman, Harold Gassner, vice president, Rosedale Foundry & Machine Co.; H. P. Spilker, president, Sterrit-Thomas Foundry Co.; C. J. Burkhart, metallurgist, Ft. Pitt Malleable Iron Division, Steel Trading Corp.; A. M. Cadman Jr., treasurer and general manager, A. W. Cadman Mfg. Co., and Earl J. Biller, general superintendent, Vulcan Mold & Iron Co., Latrobe, Pa.—*Robert Love.*

Western New York

PRESSURE molding was discussed by T. E. Barlow, Eastern Clay Products Department, International Minerals & Chemical Corp., Chicago, at the Apr. 2 meeting of Western New York Chapter of the AFS. The meeting was held at Hotel Sheraton, Buffalo, N. Y.

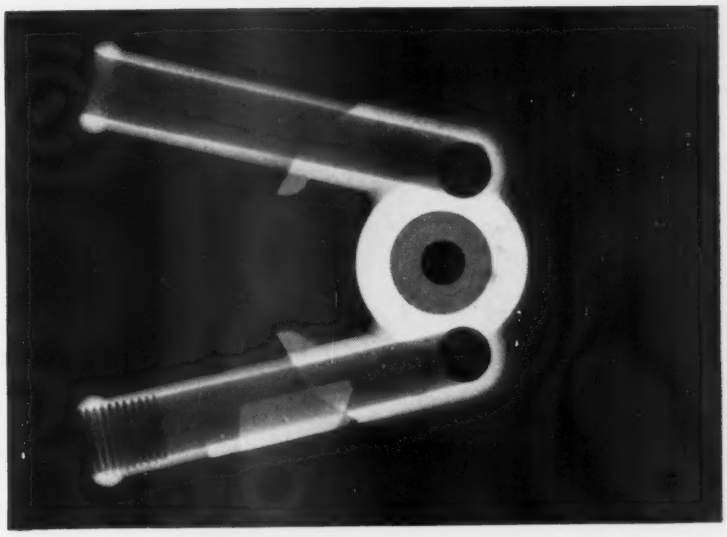
Mr. Barlow opened his talk with the statement that green sand has always been with us but, "We want to do something new about it."

Mr. Barlow pointed out that two molds can have the same mold hardness, but if one has a lower density, castings with swells may result.—*R. E. Walsh, Hickman, Williams & Co.*

Philadelphia

APRIL meeting of the Philadelphia Chapter of the AFS was held at the Engineers Club, with 125 members and guests attending. "Safety in the Foundry" was the topic for the evening and principal speaker was William H. Crawford, senior safety engineer, Liberty Mutual Insurance Co. In his informative talk, Mr.

(*Concluded on page* 206)



More for the money?

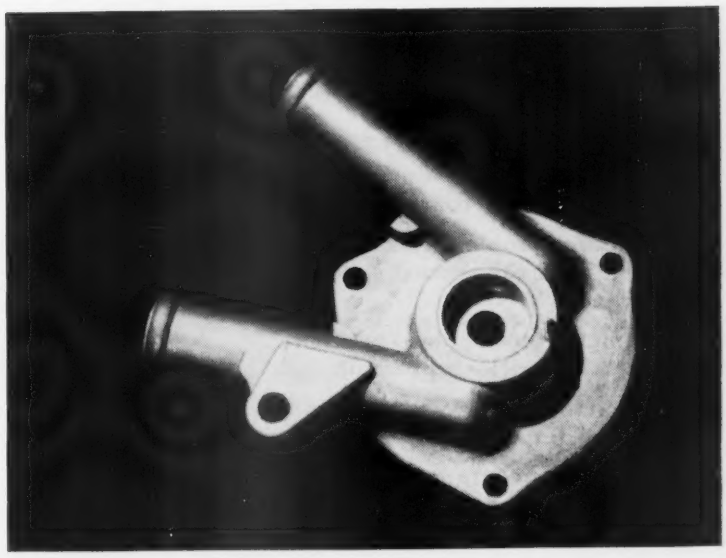
RADIOGRAPHY SHOWED HOW

This casting was a part for an automotive heater. With a big run and a low price, profit hinged on a high yield of sound castings.

Radiographs made of pilot castings revealed a few recurring faults and indicated how a minor change in casting technics could increase the yield.

This is just one more example that shows why it pays to use radiography—one more reason you find more and more progressive suppliers of castings using it.

If you want to be known for releasing only high-quality work, if you want to improve production—look into radiography. Your x-ray dealer will be glad to show you how it can help. And, if you wish, we'll send you a free copy of "Radiography as a Foundry Tool."



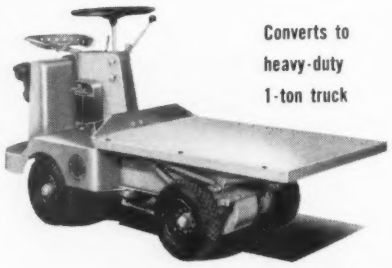
Radiography . . .

another important example of photography at work

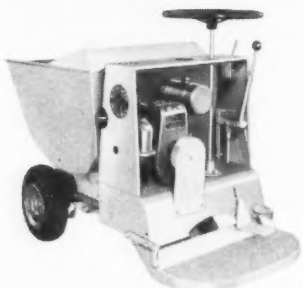
EASTMAN KODAK COMPANY
X-ray Division, Rochester 4, N. Y.

Kodak

- Has 2,000-pound load capacity.
- 15 cu. ft. gravity-dump hopper with snub-line control.
- Interchangeable 34" x 54" platform with side-board stake pockets.
- 8.3 h.p. gas engine (electric starter, muffler optional).
- 6 m.p.h. speed forward and reverse; automotive type brakes.
- Adjustable seat, easy-reach clutch lever, brake pedal.
- Automotive steering with 12-to-1 gear reduction ratio.
- Turning radius only 73 inches; overall width 35 inches.
- All-welded chassis; coil-spring-mounted steering axle.
- Dual pneumatic drive tires (or soft-core solid rubber) optional.



Converts to heavy-duty 1-ton truck



Also check smaller, 6 h.p. Moto-Bug. Has 10 cu. ft. hopper capacity . . . hauls 3/4 ton on platform . . . lifts 1/2 ton with fork lift attachment. See your Kwik-Mix distributor or write us.

Want more facts? mail to: KWIK-MIX COMPANY 3029 W. Concordia, Milwaukee 16, Wis. (Koehring Subsidiary)

Send us details on new Moto-Bug with: ☐ 15 cu. ft. hopper ☐ 2000-lb. platform

NAME..... TITLE.....

COMPANY.....

STREET.....

CITY..... STATE.....

☐ Also send literature on 10 cu. ft. Moto-Bug.®

KM448 FO

(*Concluded from page* 206)

Crawford stressed the importance of the supervisor in the safety program in any shop.

Nominees for office for the coming year were announced. Election was scheduled to be held at the May meeting.

A double-barreled treat was provided approximately 120 members and guests at the May meeting in the Engineer's Club. Kenneth Davis, Budd Co., spoke on "C" process of shell molding and Warner B. Bishop, Archer-Daniels-Midland Co., Cleveland, talked on the "D" process.

Robert J. Luckenbill, apprentice, Dodge Steel Co., was presented an award for winning the steel molding division of the national apprentice contest for the second consecutive year.

Annual chapter outing will be held July 23.—*C. R. Sweeney, Atlantic Steel Castings Co.*

Southern California

MANUFACTURE of pig iron was described by George B. McMeans, vice president, Kaiser Steel Corp., Fontana, Calif., to members of Southern California Chapter of the AFS at the Apr. 9 meeting. A movie and slides further illustrated the various steps in this operation, which included the Kaiser coal mining operation in Utah and iron ore mines which are located at Eagle Mountain, Calif.

Election of officers was held and the newly elected chairman is Charles R. Gregg, Gregg Iron Foundry; vice chairman, William C. Baud, Mechanical Foundries Division, Food Machinery Co.; secretary, J. William Mitchell, Utility Steel Foundry; and treasurer, Frank Warga, AiResearch Mfg. Co. Newly elected directors are James Oliva, Fred Dye, Harold Bierley and Art Gutch.

Winners of the local patternmaking contest were awarded prizes by John C. Beuse, chairman of the Pattern Apprentice Training Committee. Robert Johnson, Patterncraft Co., won first prize; Gerald Palmer, Santa Monica Tech student, second prize; and Charles Huff, Howard Beard Pattern Shop was winner of the third prize.

About 175 members turned out in May for each of the first two nights of the sand school held at the University of Southern California, and 208 appeared on the final night at Rodger Young Auditorium to hear Frank Brewster, Harry W. Dietert Co., Detroit, conduct the course. The program was informative and many questions were asked by an interested audience.—*Otto H. Rosentreter, National Engineering Co.*

Here are Complete facilities...

for your CAST AND MACHINED PARTS

City Pattern Foundry & Machine Company offers unparalleled facilities for the complete production of cast and machined parts. Working directly from your part print, we make the pattern, cast the parts and then precision machine them; all operations are performed right under our own roof.

ETTING THE PATTERN IN PATTERNS

In every phase of the processing the most modern methods and equipment are used. And to safeguard consistent high quality, every known piece of inspection equipment is on hand to chemically, physically and dimensionally measure your parts before shipment.

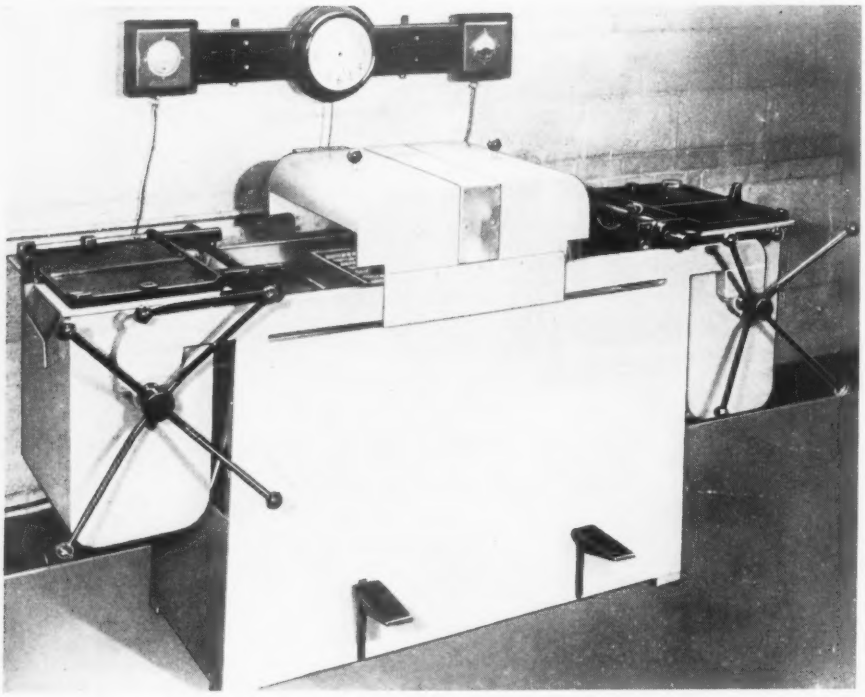
Thus, complete responsibility for your cast machined parts are in the hands of one competent, completely equipped source. Why not take advantage of the obvious benefits next time you are ordering cast and machined parts.

Since 1913...

CITY PATTERN
FOUNDRY AND MACHINE CO.

PHONE TR 4-2000 1161 HARPER AVENUE, DETROIT 11, MICHIGAN

NEW EQUIPMENT AND SUPPLIES



Shell Mold Machine: Safety Vulcanizer Co., 4145 Cottage Grove Ave., Chicago 15, Ill.—Small, compact shell molding machine is reported to produce 60 shell molds per hr. Designed to save space without losing capacity, the machine is 7 ft long and 30 in. wide. Construction is all steel. Oven design is said to provide uniform heat to produce strong shells. Pattern plates are oven heated. Temperature gages assertedly give accurate heat control.

For More Details Circle No. 1—Page 214

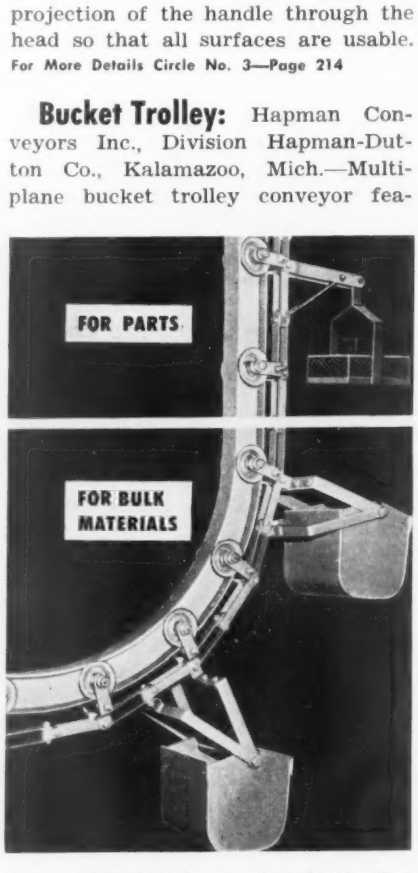
Direct Drive Fan: M & E Mfg. Co., 2571 Winthrop Ave., Indianapolis 5—Heavy-duty direct-drive fan is for use where large volumes of air are required under static pressure. The design of the heavy cast aluminum alloy fan blade is claimed to provide efficient operation in the exhaust removal of fumes, vapors, smoke and dust. Ring-mounted units are available in diameter sizes from 12 in., delivering 980 cfm, to 48 in., delivering 32,400 cfm of air. Fan motors are totally enclosed.

For More Details Circle No. 2—Page 214

Plastic Mallets: New Plastic Corp., Los Angeles—Four soft-faced mallets in four different sizes and degrees of hardness are available for use in all industries where "soft" pounding is necessary. Heads are made of plastic that has the property of recovering its shape when dented by hard blows. It will not flake, chip or mushroom, according to the manufacturer. Sting, shock and rebound have been virtually eliminated. Head design eliminates projection of the handle through the head so that all surfaces are usable.

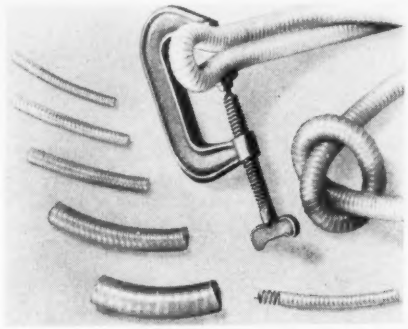
For More Details Circle No. 3—Page 214

Bucket Trolley: Hapman Conveyors Inc., Division Hapman-Dutton Co., Kalamazoo, Mich.—Multiplane bucket trolley conveyor features a bracket brace that holds the bucket trunnions at a fixed distance from trolley chain and beam, preventing buckets from swinging loosely against the chain and spilling contents. Instead, buckets rotate around their trunnions to remain upright at all times until they reach tipping rollers at discharge points. Conveyor trolley consists of a single I-beam, which may lie in a horizontal, inclined or vertical position. Buckets are self-loading, self-unloading to handle bulk materials automatically. Wire baskets or pallets can be substituted for buckets. The conveyor will handle materials such as sand, abrasive fines and other granular materials.



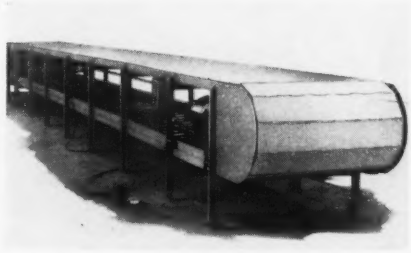
For More Details Circle No. 4—Page 214

Industrial Piping: Newage International Inc., 235 East 42nd St., New York 17—New type of industrial translucent plastic piping made from high-tensile steel wire imbedded into the piping wall is said to be free from the effects of acids or gases, is practically uncrushable, extremely flexible, chemically inert and virtually perish-proof. It will bend around a 5/16-in.-diam spindle without reducing its internal bore. Manufacturer claims the piping will withstand temperatures up to 150° F and as low as −40° F. It can be manufactured in one continuous piece, without laminations, in lengths up to 2 miles. Inside core diameters from ⅛ to ½-in. are available and outside diameter sizes from ⅜ to 1 in. are made.



For More Details Circle No. 5—Page 214

Steel Belt Conveyors: West Bend Equipment Corp., 341 Water St., West Bend, Wis.—Belt conveyors of 14 gage cold-finished steel, continuously hinged sections are available in 12 to 60 in. widths and any length from 10 ft. Belt lengths are made by addition or removal of belt links and bolted channel steel supporting structure units. Steel sprockets with positive engagement drive the conveyor with minimum belt or sprocket wear and operating



friction, according to the manufacturer. Drive section is equipped with a high-torque, gear-in-head motor with enclosed case in which gears operate in a continuous oil bath. Self-alignment ball bearing pillow blocks support the drive and idler shafts. A screw type take-up maintains proper belt tension at the idler section.

For More Details Circle No. 6—Page 214

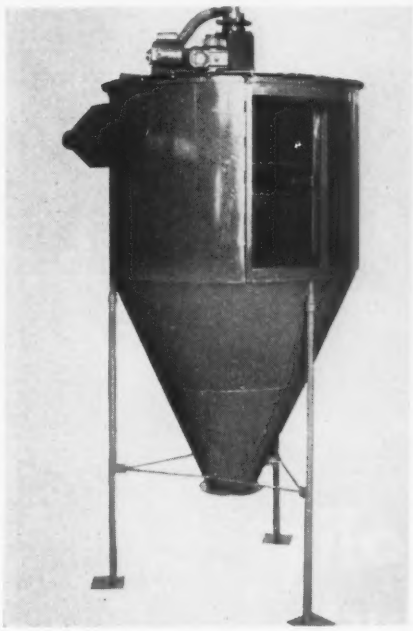
Parting Agent: Dow Corning Corp., Midland, Mich.—A 5 per cent solution of a high-viscosity silicone in solvent, used primarily for direct application in the shell mold process, is claimed to be an effective parting agent on patterns having deep draws and only slight draft. When applied to a hot or cold pattern surface, it rapidly wets the metal, and solvent evaporates to leave a thin, uniform parting film. The residual film of silicone fluid is heat-stable and oxidation resistant. Manufacturer states the agent is virtually incompatible with organic resins, is not affected by the thermosetting resin-sand mixture, gives clean easy release of the molded shell, does not decompose or form a carbonaceous build-up, and keeps mold cleaning time and maintenance costs to a minimum.

For More Details Circle No. 7—Page 214

Aluminum Shot: Ingot Products Supervisor, Reynolds Metals Co., 2500 South Third St., Louisville 1, Ky.—Aluminum shot, approximately ⅜-in. in diam, is for use in deoxidizing high grade steels and for alloying with zinc to make Zamak No. 3 and No. 5 alloys. The shot is made as slightly flattened spheroids, free from sharp points, and solid with a tolerance range of plus or minus ⅛-in. on the standard ⅜-in. diam. It is approximately 99.3 per cent pure.

For More Details Circle No. 8—Page 214

Dust Collector: Turner & Haws Engineering Co., 87 Gardner St., Boston, Mass.—Dust collector employs a filter medium supported by a perforated metal cylindrical cage, eliminating virtually all strength requirements of the filter. Dust-laden air enters the collector housing outside the filter and is cleaned as it passes to the inside of the cylindrical filter. Filter is cleaned by a continuously rotating vertical blow tube which passes between the supporting metal cage and the filter medium. High-pressure air forced through a narrow, vertical slot in the tube loosens dust on the filter surface and blows it into a receiver tube which rotates outside the filter and in synchronization with and opposite the blow tube. One electric motor drives the rotating blow tube assembly and the positive displacement blower. Normal operating capacities run from 300 to 10,000 cfm.



For More Details Circle No. 9—Page 214

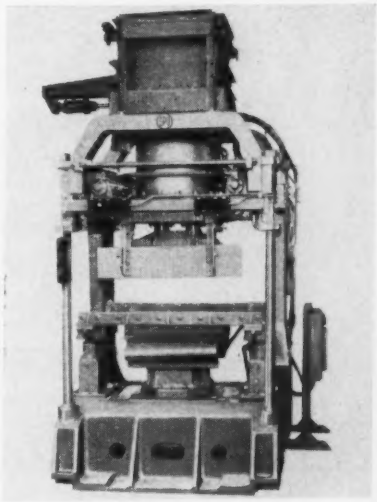
Segment Gage: Oliver Machinery Co., Grand Rapids 2, Mich.—Gage for use on circular saw tables is said to simplify complicated operations in pattern and woodworking shops. Unit includes bar, scale, and support assemblies and is designed for use on any of the company's saw benches. Heavy brass scale on top of the bar includes all the instructions and graduations necessary to set up for the required number of segments to be cut in the circle.

For More Details Circle No. 10—Page 214

Torque Drive: Frank G. Hough Co., 703 Seventh St., Libertyville, Ill.—Introduction of new models to the company's line of front-end shovel-loaders include torque converter drive as standard equipment on one model and power steering on the other. Improved performance is said to result from use of the torque converter,

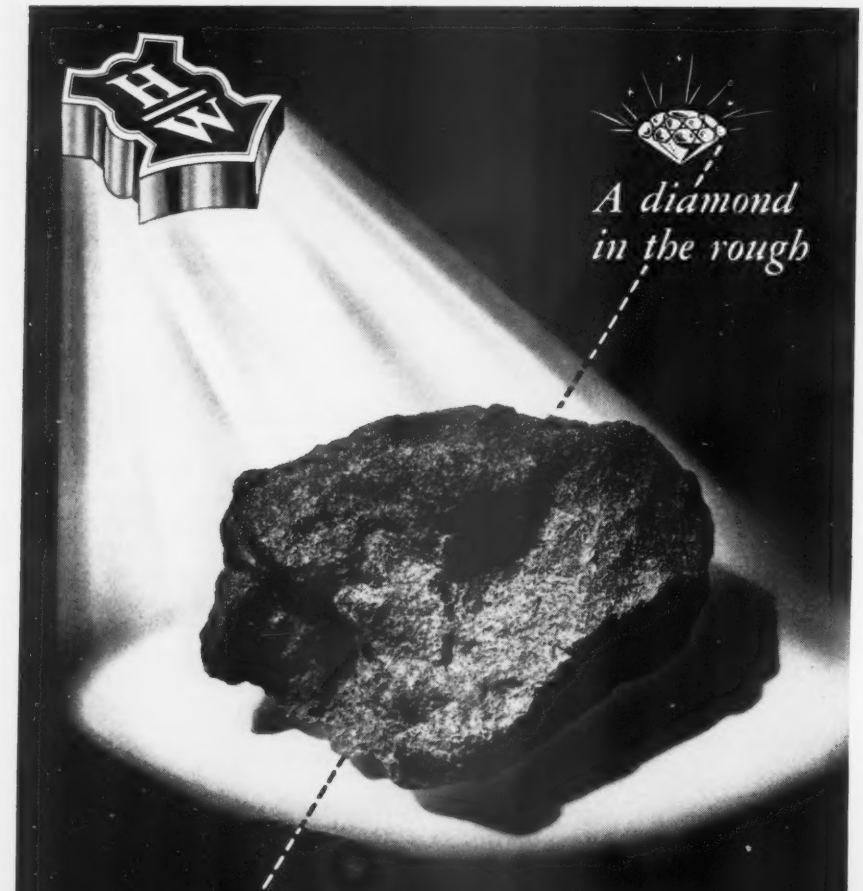
High-Speed Molding Machine Is Semiautomatic

SEMIAUTOMATIC jolt squeeze strip roll-on roll-off molding machine is designed for modernization of foundries where plant conditions or production volume do not permit the use of full automation as provided by completely automatic molding machines. The machine can be used separately or in conjunction with other automatic devices. It features an overhead squeeze cylinder, sand metering device, simple electrical controls and an inverted jolt mechanism. All operations are automatically controlled by pushbutton-actuated solenoid valves. Jolting action is timer-controlled and the squeeze is regulated by a pressure switch.



Machine has a squeeze capacity of 57,000 lb and jolt capacity of 4000 lb on standard 80 psi line pressure. Pattern draw is 12 in., diameter of jolt cylinder 12 in., and diameter of squeeze cylinder 30 in. Free air consumption per cycle is about 96 cu ft. Flasks ranging from 22¼ to 37½-in. in width can be utilized. The machine is manufactured by SPO Inc., 6448 Grand Division Ave., Cleveland 25, O.

For More Details Circle No. 11—Page 214



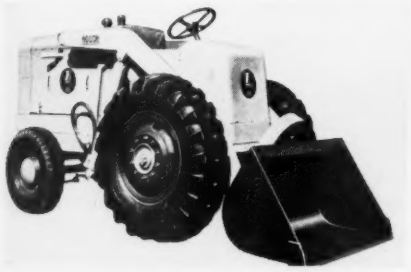
Indianapolis
By-product
FOUNDRY COKE

Recognized by the foundry industry as the standard of quality—the "yardstick" by which coke is judged. Uniform size and structure assure easily controlled temperatures. The high efficiency of Indianapolis Coke means exceptional economy and satisfaction.

We invite your inquiries
Contact any HICKMAN-WILLIAMS *office*

Hickman, Williams & Co.
(INCORPORATED)
CHICAGO · DETROIT · CINCINNATI · ST. LOUIS · NEW YORK
CLEVELAND · PHILADELPHIA · PITTSBURGH · INDIANAPOLIS
Established 1890

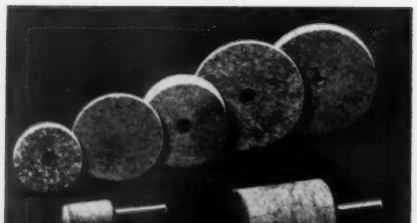
which is a three-element, self-cooled type that automatically multiplies torque output of the engine in direct



proportion to the load requirement. During light load conditions it reverts automatically to fluid-coupling action. This drive reduces the amount of gear-shifting and "clutching" and driver concentration to provide faster cycles and higher sustained output if required, according to the maker.

For More Details Circle No. 12—Page 214

Abrasive Wheels: Metal Removal Co., 1546 North Orleans, Chicago 10—All-purpose wheel is a blend of abrasive grains, synthetic fibers and a special binding agent for roughing



and finishing practically any material in one operation. Wheels include mounted points, straight wheels, depressed center discs and cutoff wheels. Being resilient and flexible, they are said to absorb shock, reduce chatter, and resist loading. They are reportedly fast cutting and self-dressing on deburring, polishing, weld grinding and general abrading of tough, difficult-to-grind metals.

For More Details Circle No. 13—Page 214

Hardfacing Electrodes: Wall Colmonoy Corp., 19345 John R St., Detroit 3—Hardfacing electrodes of chromium, boron and iron composition are available to provide improved weldability and arc stability. They are available in two types, one for hardfacing applications where extreme impact with high abrasion resistance is required, the other for applications where extreme abrasion and impact resistance are required. Manufacturer states that the electrode deposits do not require cleaning or slag removal before welding on successive deposits. They can be used on applications where the de-

(*Continued on page* 215)

HELPFUL IDEAS FOR FOUNDRYMEN

HERE ARE QUICK REVIEWS OF NEW LITERATURE—available to foundrymen as "idea" and reference information. Readers in the United States and Canada may obtain copies by using the attached cards. Readers in foreign countries should write direct to the manufacturer offering literature.

61. Electronic Metal Detector

Dings Electronics, Inc., 4740 W. Electric Ave., Milwaukee 46, Wis.—The Dings electronic metal detector which will detect even minute particles of any metal, ferrous or nonferrous, is described in bulletin B-1920-A. Features are evaluated.

62. Sand Mullers

Pettibone Mulliken Corp., Beardsley & Piper Div., 2424 N. Cicero Ave., Chicago 39, Ill.—Brief description of the 80A Speedmullor and Mulbaros portable sand mulling machines is provided in single data sheet.

63. Grommet V-Belts

B. F. Goodrich Co., Industrial Products Div., Akron, O.—Description of grommet, high capacity and multicord V-belts is contained in 8-page form 2170. First type features no overlapping cord sections, the second, very little stretch, while third type boasts multiple plies of tightly twisted rayon cord. Procedure for designing a V-belt drive, plus many data tables are highlights.

64. Industrial Cranes

Industrial Crane & Hoist Corp., 315 N. Ada St., Chicago 7, Ill.—Photos depicting typical installations are featured in 8-page brochure HG-948 on single girder, hand geared cranes. Underhung and top running units are shown.

65. Spray Binders

Delta Oil Products Co., Milwaukee 9, Wis.—Instructions for use and application of Delta spray binders for steel foundries and for gray iron, malleable and nonferrous foundries are offered in 4-page folder.

66. Abrasive Segments

Simonds Abrasive Co., Tacony & Fraley Sts., Philadelphia 37, Pa.—Abrasive segments for surface and machine knife grinding are subject of 4-page illustrated folder ESA 188. Various types of abrasives and bonds, their uses and advantages and recommendations for various jobs are covered.

67. Assorted Equipment

Simplicity Engineering Co., Durand, Mich.—Described and illustrated in 24-page catalog F-7 are various types of shakeouts, gyrating sand screens, sand conditioning and lump crushing equipment, feeders and conveyors, magnetic separators and company facilities.

68. Electric Hoist

Robbins & Myers Inc., Hoist & Crane Div., Springfield, O.—Design and construction features of the J-3 electric wire rope hoist, made in 1000, 2000 and 4000-lb capacities, are evaluated in 6 pages of illustrated bulletin 890. Complete ratings and specifications are given.

69. Steel Shot

Steel Shot Producers Inc., Butler, Pa.—Tru-Steel shot is described in 4-page folder as high-carbon, fully heat-treated steel shot of tool steel quality. Shot is screened to SAE specifications. Uniformity of hardness, plus accurate grading assure high peening efficiency.

70. Shell Pour Off System

Arrow Pattern & Engineering Co., 2340 McKinley Ave., Erie, Pa.—Complete description of the Arrow shell pour off system, with illustration of a typical installation, is provided in 2-page mail piece. System is shipped ready for assembly.

71. Automatic Molding Machines

Wm. H. Nicholls Co., Richmond Hill 18, Long Island, N. Y.—9-page brochure dealing with automatic molding units presents an outline of operations plus specifications on the type C automatic drag molding machine. Discussion covers measuring hoppers, flask return elevators, drag mold turnover, drag mold transfer and control equipment. Engineering drawing of complete unit is provided.

72. Core Coatings & Washes

Frederic B. Stevens Inc., 1800 Eighteenth St., Detroit 16, Mich.—Kit of folders and data sheets contains information on 180-D core coating, steel core and mold wash, No. 125 core wash for brass and bronze, No. 114 core coatings for gray iron castings and Tri-Cote paste type core and mold coating.

73. Centrifugal Fans

General Blower Co., Morton Grove, Ill.—Backward-blade centrifugal fans for heavy duty industrial air moving applications are subject of 32-page bulletin BB-102. Design and construction, engineering and characteristics of these units are considered, and volume capacities and velocities are tabulated for full range of sizes. Specifications and dimensions complete the piece.

74. Pneumatic Tools

Skil Corp., 5033 Elston Ave., Chicago 30, Ill.—Features of Skil pneumatic tools are pointed up in illustrated 12-page booklet F-10142. Piece covers pneumatic drills, screwdrivers, nut runners, grinders, hammers, disk sanders and polishers as well as accessories. Specifications are given on all items.

75. Copper-Tin-Lead Alloys

H. Kramer & Co., 1339-1345 W. 21st St., Chicago 8, Ill.—8-page issue of the "Kramer Alloy News" discusses aluminum and silicon contamination in the copper-tin-lead bearing alloys as well as the use of phosphor copper in the brass and bronze foundry.

Additional Information?

For additional information on any of the items described under "New Equipment and Supplies," "Trade Publications" or "Ideas for Foundrymen" in this issue—simply circle corresponding item numbers on accompanying cards

Helpful IDEAS

76. Production Machine Tools

Rockwell Mfg. Co., Delta Power Tool Div., 400 N. Lexington Ave., Pittsburgh 8, Pa. — Drill presses, grinders, band and circular saws, sanders, jointers, scroll saws, shapers and lathes are among production machine tools listed in 32-page catalog B-53. Photos showing typical applications are featured and latest price data are included.

77. Chainless Conveyors

Landahl Conveyor Co., 534 Dennison Ave., Columbus, O. — Chainless conveyor described and illustrated in 8-page bulletin will carry any load through any radius curve vertically or horizontally, even a spiral. Conveyor can be of any desired length. Basic features are described and a sample plan with drawings is included.

78. Flasks, Jackets, Upsets

Fremont Flask Co., 1000 Wolfe Ave., Fremont, O.—Series of four illustrated data sheets give information on tapered magnesium flasks, cast iron and cast aluminum jackets and aluminum and magnesium upsets. Features are described in some detail.

79. Scoop Loading Truck

Jaeger Machine Co., Columbus 16, O.—12-cu ft model LP-12 Load Plus bulk materials handling truck described and illustrated in 2-page data sheet is hydraulically controlled and will lift up to 1200 lb. Features, specifications and other necessary data are given.

80. Coremaker's Handbook

Hercules Powder Co., Naval Stores Dept., Wilmington 99, Del.—60-page illustrated handbook "Hercules Truline Binder" gives details on this powdered natural resin binder for coremaking. Booklet contains a wealth of practical data for steel, brass and gray and malleable iron foundry coremaking.

81. Mobile Cranes

Hughes-Keenan Corp., P. O. Box 360, Delaware, O.—How the Roustabout model V mobile crane is made, its design features, operation and complete and detailed specifications are subject of 24-page illustrated bulletin. Diagram shows lifting capacities at various distances.

82. Core Wire Straighteners

Kane & Roach Inc., Syracuse, N. Y. —"Save Money Reclaiming Used Core Wire" is title of 4-page illustrated bulletin No. 58B. It relates how savings of from $75 to $150 per month can be realized. Specifications and general data for various models available are given.

83. Abrasive Snagging Wheels

Simonds Abrasive Co., Tacony & Fraley Sts., Philadelphia 37, Pa.— Data on use of abrasive snagging wheels in steel mills and foundries are found in 12 illustrated pages of brochure ESA-62. Sections are devoted to recommendations for billets, steel castings and gray iron. Wheels for use on portable pneumatic, high cycle electric and flexible shaft grinders are also covered.

84. Crucible Melters' Handbook

Crucible Manufacturers Association, 90 West St., New York 6, N. Y. —Fourth edition of "Crucible Melters' Handbook" contains 16 pages of useful, illustrated information on sound practice in using, storing and handling crucibles. In addition, their general principles and field of applications are outlined. Helpful tabular data are included.

85. Radioactive Exposure Shield

Technical Operations Inc., 6 Schouler Court, Arlington 74, Mass.—Panoramic exposure shield which permits use of strong radioactive sources in routine radiography is described and illustrated in data sheet. Specifications, operation and construction details of two models are provided.

86. Tractor Shovel

Contractors Machinery Co., Batavia, N. Y.—Model LA-40 Loadster tractor shovel described in 2-page illustrated bulletin L-404 has a 12-cu-ft bucket and will lift up to 1000 lb. Hydraulic control is featured. Bulletin lists essential specifications and covers principal features.

87. Industrial Cranes

Harnischfeger Corp., 4400 W. National Ave., Milwaukee 14, Wis.— Wide variety of P & H cranes are illustrated and their construction features described in 36-page bulletin C6-2. They feature roller bearing trolleys, welded girders, full vision cabs and Magnetorque alternating current crane control. Specifications for each type are given.

88. Moisture Stabilizer

Fred C. Archer, Inc., 606 W. Wisconsin Ave., Milwaukee 3, Wis.—Compact electrode moisture content stabilizer which provides protection for low hydrogen coated electrodes is subject of 4-page illustrated bulletin. It combines chemical and electrical dehydration.

89. Sand Additive

United States Graphite Co., Saginaw, Mich.—Foundry sand performance is improved, given good flowability and heat resistance by addition of Sand-Mex, a graphite product. It is chemically inert and nongaseous. As described in 4-page bulletin No. 16, it reduces wear and abrasion on sand handling equipment.

90. Metal Melting Furnaces

Stroman Furnace & Engineering Co., 9900 Franklin Ave., Franklin Park, Ill.—Among types of metal melting furnaces described and illustrated in 20-page bulletin 800 are stationary crucible, stationary lip pour crucible, manual tilting, hydraulic tilting and others. Also covered are skip hoists, smelters furnaces, die casting furnaces, core ovens, burners and blowers.

91. Match Plates

Accurate Match Plate Co., 1847 W. Carroll Ave., Chicago 12, Ill.— Descriptions, illustrations and prices are given for extensive line of match, cope and drag plates in 16-page illustrated catalog. Examples of patterns and cores produced by various pressure molding methods are shown and techniques for producing are described.

92. Cutoff & Snagging Wheels

Cleveland Quarries Co., Sterling Abrasives Div., Tiffin, O.—Specifications for cutoff and snagging operations and the correct abrasive product for the job are found in 4-page illustrated data sheet. Stand, swing, frame and portable operations are covered.

93. Electric Furnaces

United States Steel Corp., American Bridge Div., Pittsburgh 30, Pa.— "The Heroult Electric Furnace" is title and subject of 28-page illustrated brochure which outlines the features and applications of this unit for melting and refining. Units have maximum rated charges from 8000 to 400,000 lb. Various types and their auxiliary equipment are covered in detail.

94. Sand Core Baking Ovens

Girdler Co., Thermex Div., Louisville 1, Ky.—Illustrated data sheets present specifications, dimensional drawings, optional features and other information on dielectric sand core baking equipment. Various units range upward from 750 lb of resin bonded cores per hour.

95. Heating Elements

Norton Co., Refractories Div., Worcester 6, Mass.—Technical data, use,

accessories and physical and electrical specifications for line of Crystolon heating elements for electric furnaces and kilns are found in 24-page illustrated bulletin 146. They range in size up to 1¾-in. diameter.

96. Ingot & Casting Alloys

R. Lavin & Sons, Inc., 3426 S. Kedzie Ave., Chicago 23, Ill.—Specifications, chemical composition and physical properties for the following ingot and casting alloys are found in chart form in 20-page "LaVingot News and Views": brass and bronze, magnesium bronze, aluminum bronze, silicon bronze, copper-nickel, aluminum. Also covered are zinc die casting and slush metal alloys, babbitt alloys, copper anodes and type metals.

97. Vibrators & Refractory Guns

Burgess-Sterbentz Corp., Vibron Div., 3790 W. 150th St., Cleveland 11, O.—Typical installations of Vibron pneumatic vibrators, along with operational and installation data, specifications and applications are found in plastic-bound illustrated catalog. Also described and illustrated is the Bantam refractory gun for use in lining small ladles, runners, cupolas and furnaces.

98. Core Binders

Monsanto Chemical Co., Plastics Div., Springfield 2, Mass.—16-page illustrated technical data bulletin "Phenolic Resin Core Binders . . ." contains material on resin properties, adaptability to standard coreroom practice, advantages, preparation of core sand, mixers and mixing, coremaking methods, release agents, handling methods and other related subjects.

99. Foundry Practice

Foundry Services Inc., 260 Madison Ave., New York 16, N. Y.—"Foundry Practice" is title of a new publication, issues of which will include articles on ferrous and nonferrous alloys and technical reports. First issue covers moisture porosity in iron castings, distortion of thin iron castings, aluminum sand casting defects, deoxidation of copper and nickel alloys and efficiency of degassing aluminum.

100. Research

Vanadium Corp. of America, 430 Lexington Ave., New York, N. Y.—12-page illustrated booklet gives details of the research program carried on by this company, including the new Cambridge, Ohio center. Story of company research over the years is graphically told.

101. Engineering Service

Edwin S. Carman Inc., Lee Rd. at Mayfield, Cleveland 18, O.—Illustrated 4-page bulletin contains outline of engineering services for foundries available from this company. Included are surveys, reports, plant design and remodeling, cost systems, production and other control methods.

102. Molding Sand Bond

Magnet Cove Barium Corp., P. O. Box 6504, Houston 5, Tex.—Bentonite bonding agent for molding sand is discussed in 4-page illustrated bulletin. Properties of the Yellowstone brand are discussed in detail, charts showing chemical analysis and comparative permeability and wet and dry compression strengths.

103. Cut-Off Wheels

Raybestos-Manhattan, Inc., Manhattan Rubber Div., Passaic, N. J.—Illustrated catalog 6649 has 4 pages of data on radially and laterally reinforced foundry cut-off wheels. Wheels are available in 14, 16, 18, 20 and 24-in. sizes as standard. Other foundry wheels are also discussed.

104. Helpful Data

Whiting Corp., Harvey, Ill.—Partial list of contents in 48-page illustrated handbook includes hints on cupola operation with data on linings and slagging, electric furnace data with material on electrodes, furnace sizes and table of Btu per pound, thermal properties on metals, air requirements for combustion, ladle capacities and atomic weights.

105. Shot Blast Liners

Latrobe Steel Co., Special Products Div., Latrobe, Pa.—12-page illustrated catalog on BR-4 shot blast liners gives full details of type and size ranges of these products avail-

SUBSCRIBERS IN FOREIGN COUNTRIES—please note:

We regret that owing to postal and mechanical problems over which we have no control, we are able to process literature requests mailed in the *United States and Canada* only until further notice. We suggest that you write direct to the manufacturer for product information at the addresses given in advertisements and literature descriptions.

able. They are specially designed to fit Wheelabrators. Vanadium-carbon composition gives high abrasion resistance. Liners are heat treated and die quenched to insure proper radii and shape.

106. Diaphragm Valves

Grinnell Co., Providence 1, R. I.—Grinnell-Saunders diaphragm valves operated by handwheel, lever or power are completely described and illustrated in 20-page catalog sv-1951. Valves are used in almost any piping system where corrosion, abrasion, contamination, clogging, leakage and maintenance are problems.

107. Vibrators

Martin Engineering Co., Kewanee, Ill.—40-page loose-leaf illustrated binder contains details on ten models of pneumatic vibrators for coreboxes and other foundry equipment. Units, which can be mounted horizontally or vertically, are available in a wide range of capacities. Steel ball moving on hardened races is the only moving part. Other foundry equipment such as sand arrester tubes, core box dowel pins and inserts is also covered.

108. Pallets & Boxes

Wood Fabricating Co., 3760 Wyoming, Dearborn, Mich. — Permanent and expendable pallets and pallet boxes are illustrated and described in 4-page catalog. Other wood packaging products covered include crates and boxes and precut lumber or dunnage.

109. Pattern Buyer's Guide

Master Pattern & Mold Co., 1315 Main Ave., Cleveland 13, O. — A general method of pattern selection is made available in 24-page, pocket-size "Pattern Buyers Guide." Booklet is concerned with patterns and pattern equipment engineered for industries devoted to casting metals into molds of sand and iron. Glossary of terms is highlight.

110. Core Box & Fillet Machine

Glover Mfg. Co., 734 Mohican Place, Meadville, Pa. — Single descriptive sheet on a core box and fillet machine with large ball bearing spindle illustrates cuts that can be made and points out machine advantages.

111. Ceramic Strainer Cores

Industrial Ceramic Products, Inc., Columbus, O.—A chart which shows all dimensions of the seven standard sizes in which ICP ceramic core strainers are made is featured in 6-page folder.

112. Crucibles & Refractories

National Crucible Co., Mermaid Lane & Queen St., Philadelphia 18, Pa.— Carbon bonded crucibles and crucible furnace refractories are described and specified in 8-page brochure. Other carbon bonded items covered are aluminum crucibles and bowls, base blocks and specialties.

113. Foundry Equipment

Grindle Corp., 16231 Turner Ave., Harvey, Ill.—Effectively illustrated and briefly described in 28-page bulletin J-51 is complete melting, heat treating, stack gas purifying and accessory equipment. Last group covers instruments for temperature, flow, pressure, indicating, recording and control.

114. Core Oils

E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.—The Hy-Ten 300 series of core oils are described and their advantages pointed out in 4-page illustrated folder 2-40. A question and answer section brings out what these new oils can do for the user.

115. Core & Mold Ovens

Foundry Equipment Co., 1831 Columbus Rd., N. W., Cleveland 13, O.—Typical core and mold oven installations in leading gray iron, malleable, steel and nonferrous foundries are illustrated in 24-page bulletin 54. Portable, rolling drawer, transrack, tower, horizontal conveyor core, conveyor redry, dielectric, car type and special purpose ovens are pictured. Mold dryers, heating systems and auxiliary equipment are covered as well.

IMPORTANT READING FOR FOUNDRYMEN

We have a limited quantity of the following reprints which we can furnish while they last.

116. Gating Factors

Results of gating system studies conducted at the Naval Research Laboratory are summarized in FOUNDRY reprint "Gating Factors" by W. H. Johnson, H. F. Bishop and W. S. Pellini, Report aims to develop simple working concepts which the foundryman can apply to practical design of gates. Systems are well illustrated.

117. Foundry Industry Progress

"A Special Report on Foundry Industry Progress . . ." is a FOUNDRY reprint presenting discussion by industry leaders on subjects relating to the past and present of the industry and its future potential. Articles deal with progress in castings and gray iron, aluminum, steel, brass and bronze, malleable iron and magnesium castings.

118. Casting Valve Seats

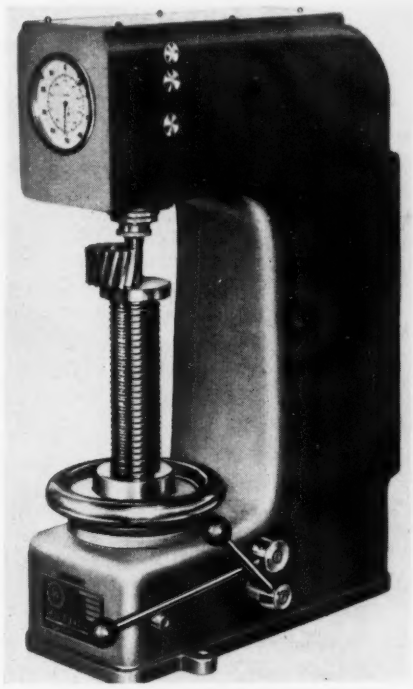
Facilities and techniques of one company for producing 100,000 valve seat insert castings daily are described in detail and illustrated with 12 photographs in the FOUNDRY reprint. Castings range in weight from less than 1 oz to over 25 lb and are made of various alloys.

(*Continued from page* 210)

posit must be welded vertically. Typical applications include the welding of dipper teeth, shot blasting equipment, drag chains, cable bits, fan blades, coal and coke chutes and grader blades.

For More Details Circle No. 14—Page 214

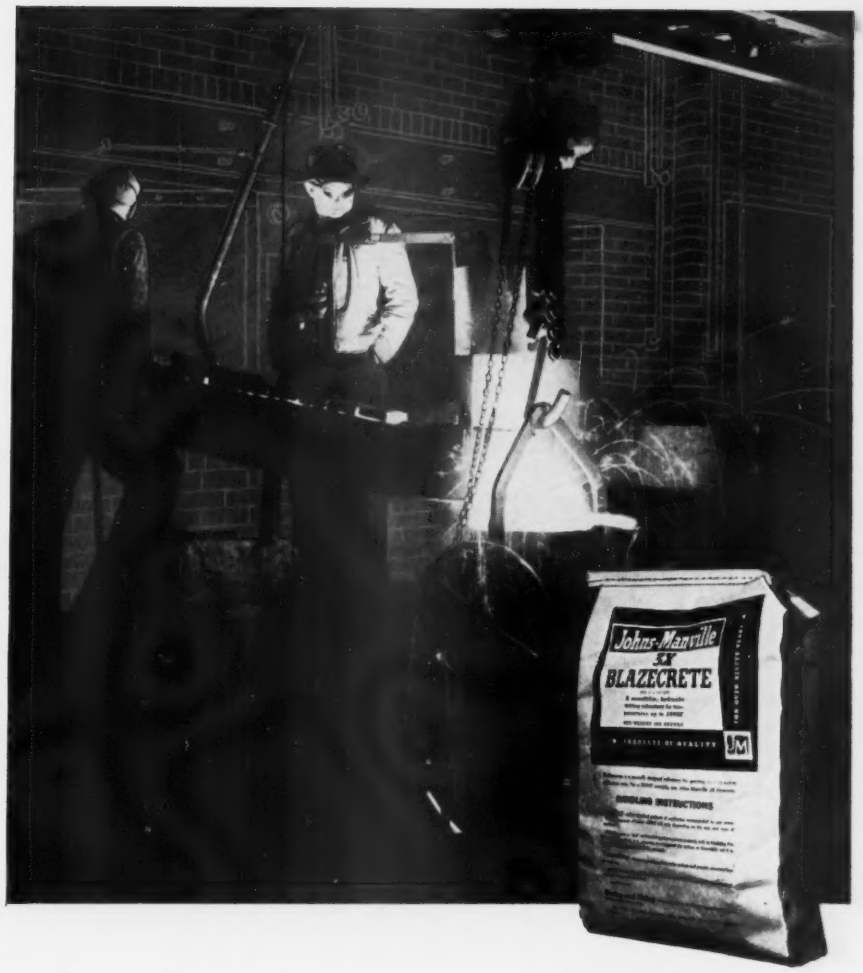
Hardness Tester: Gries Industries Inc., Testing Machines Division, New Rochelle, N. Y.—Rockwell hardness testing machine reportedly is



capable of performing 400 high-precision tests per hour. The machine's 10-kg minor load is produced by gravity instead of by spring pressure. After the minor load is applied, no "setting" is required to make the dial indicator stand automatically at the correct zero. Release of the oil brake applies the major load through the weight block suspended on the loading lever, and depth indication begins at once. When dial pointer has almost stopped, another lever removes the major load while the minor load remains. The final test result appears immediately.

For More Details Circle No. 15—Page 214

Grinders: Delta Power Tool Division, Rockwell Mfg. Co., 432 North Lexington Ave., Pittsburgh 8, Pa.—Company has announced basic improvements in all single-phase and three-phase models of its standard 7-in. grinders and buffers. Manufacturer states that the redesigned models have been improved to offer higher starting torque, higher breakdown torque, lower operating costs and greater adaptability. Single-phase models feature capacitor-start motors in place of split-phase motors,



Produce cleaner forgings

. . . with ladle linings made of J-M 3X Blazecrete® — the hydraulic setting refractory

J-M 3X Blazecrete makes possible cleaner forgings because it has great ability to resist penetration and attack by molten metal.

3X Blazecrete . . . the 3000F refractory . . . is easily and quickly applied . . . mix with water like ordinary concrete, and slap-trowel to desired thickness. Hardens without application of heat. Contains no harmful irritants . . . safe even for hand application. 3X Blazecrete is furnished as a dry mix, and may be stored indefinitely without deterioration.

Longer lasting linings can be built with 3X Blazecrete because it is spall-resistant, withstands slagging action and has negligible shrinkage.

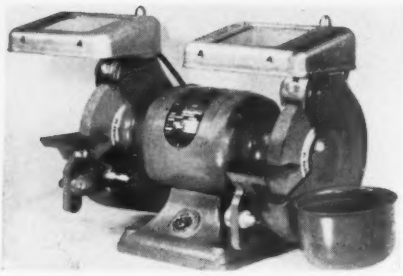
Send for free brochure on Blazecrete (RC-28A) describing its properties and uses. To obtain your copy—as well as additional application details—write Johns-Manville, Box 60, New York 16, N. Y. In Canada, 199 Bay Street, Toronto 1, Ontario.

Whether you gun it... *or slap-trowel it...*

JOHNS-MANVILLE JM PRODUCTS

Johns-Manville BLAZECRETE

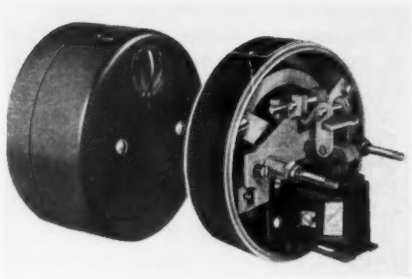
BUILDS BETTER REFRACTORY LININGS



and all single-phase and three-phase models except the 550-v model have been changed from single to dual voltage. The dual voltage feature allows the single-phase models to operate on either 115 or 230 v current and the three-phase models on 220 or 440 v.

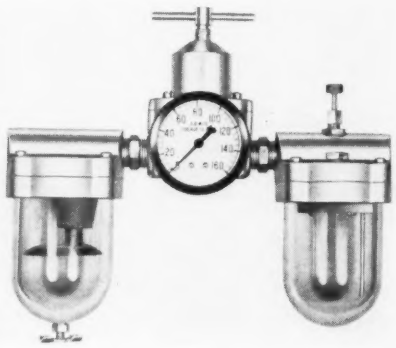
For More Details Circle No. 16—Page 214

Disk Brake: Stearns Magnetic Inc., Milwaukee 46—Two series of magnetic disk brakes for fractional-horsepower motors meet the new NEMA frame standards in the 1/20 to ⅓-hp range and the 1/6 to 2-hp range. The brake for the former is 5 in. in diam., less than 3½ in. long and has a torque range from 6 lb in. to 1 lb ft. It is designed for mounting on standard NEMA C and bell for frames 42-C and 48-C. The latter brake is available in four torque ratings—1½, 3, 6, and 9 lb ft. This brake is designed to mount on new fhp motor frames 56-C and 66-C and integral horsepower motor frames 182 and 184.



For More Details Circle No. 17—Page 214

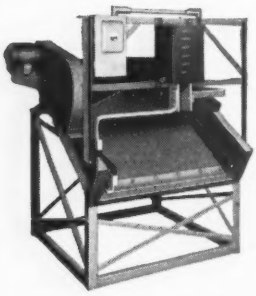
Air Line Unit: Air-Mite, 4417 West Carroll Ave., Chicago 24—Permanent mold castings, brass fittings and high-strength transparent plastic bowls are used in combination air filter-regulator-oiler unit with maximum operating pressure of 160 psi. Unit is claimed to offer accurate and stable line pressure regulation, precisely controlled oil injection and an efficient air filtering method for the air operation of machine tools, fixtures and components. Long service life and fast response to air demand are claimed for the regulator, which incorporates a piston cup instead of a diaphragm. The filter features a porous, sintered bronze filtering element said to provide maximum air cleaning efficiency with minimum maintenance. The lubricator provides controlled injection of preatomized oil directly into the air stream to insure good lubricating efficiency.



For More Details Circle No. 18—Page 214

Wireless Intercom: S. A. Hirsh Mfg. Co., 8051 Central Park Ave., Skokie, Ill.—Portable wireless intercom plugs into any electrical outlet and requires no wiring or installation. It transmits over a radius of several miles. The intercom can be used in plant-to-plant, intra-plant, or inter-departmental communication.

(*Continued on page* 218)



For Fast, Efficient Cleaning of Foundry Sand

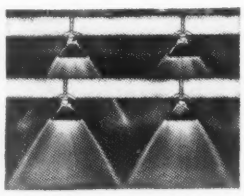
Foundry operators are discovering the practical usefulness of the Leahy NO-BLIND Vibrating Screen equipped with FlexElex electric heating of the screen jacket for dry screening of sticky or damp sand.

FlexElex heating is employed where, due to moisture, fine sticky or dust size grains have a tendency to coat the wires of the screen cloth and eventually blind them. FlexElex, by keeping the mesh dry, prevents any such build-up and assures wide open mesh for full capacity and accurate screening.

For full information, ask for Bulletin 15-J.

CONCENCO Spray Nozzles

These handy nozzles are simple, flexible and economical for employment as air nozzles with moulding equipment. They can be definitely aligned for washing, sluicing or spraying operations. They are removed or replaced in a moment's time.



THE DEISTER★ CONCENTRATOR COMPANY

CONCENCO PRODUCTS

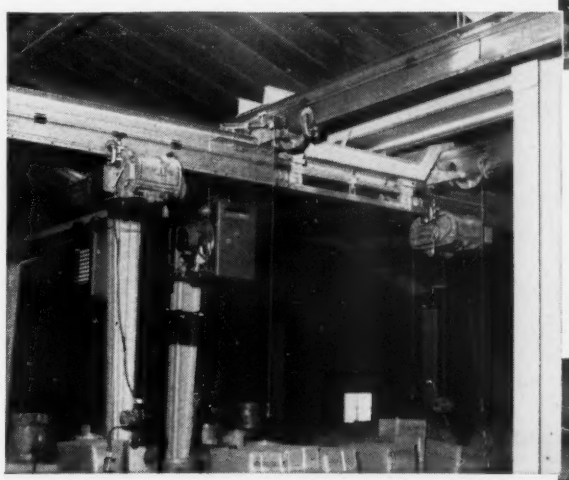
★ *The ORIGINAL Deister Company* ★ *Inc. 1906*

935 Glasgow Ave. • Fort Wayne, Ind., U.S.A.

.....AMERICAN MONORAIL CRANES

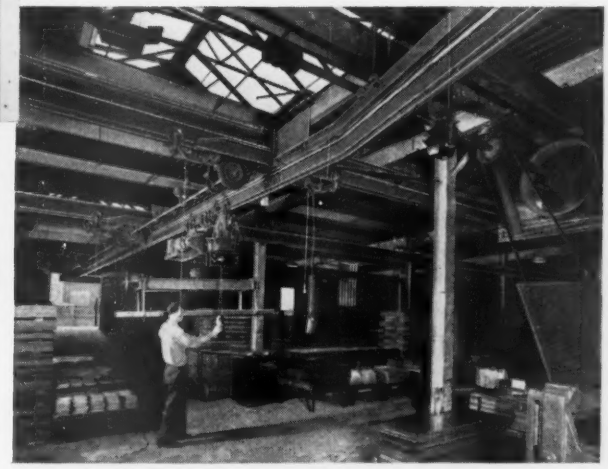
for smooth operation at low maintenance cost use....

Three-ton hoist hook service extends from craneway to craneway by finger-tip controlled passage of carrier across crossover with cranes interlocked at each end.



One-ton hoist operated from crane bridge to crane bridge interlocked at crossover between craneways.

Three MonoRail cranes are interlocked to form passageway for transfer from receiving dock to steel storage area. Crane in foreground interlocks with spur track to each shear.



To handle variable loads over maximum areas, MonoRail Cranes offer smooth travel, easy movement, interlocking service between and beyond craneways, low initial cost and most important low maintenance cost. American MonoRail engineers are experienced in all phases of "up and over" handling. They are available for free consultation at your convenience.

Write for C-1 Bulletin

AMERICAN OVERHEAD HANDLING EQUIPMENT

MONORAIL COMPANY

13104 ATHENS AVENUE • CLEVELAND 7, OHIO

(*Continued from page* 216)

It frees telephones for outside calls, combining the services of a watchman (on constant transmit) and messenger (on talk-listen).

For More Details Circle No. 19—Page 214

Ear Protector: David Clark Co., Worcester, Mass.—Muff-type sound protectors are claimed to give excellent protection against high and low frequency noise and are safe, sanitary and comfortable. They require no special fitting and are washable. Three styles are available—medium lightweight cotton helmet, lightweight, nylon-mesh helmet and for intermittent use, the headband type. Helmets can be used with safety glasses and hard hats. Headband type permits use of safety glasses. Helmet types come in gold, green or brown, headband type in black or white.

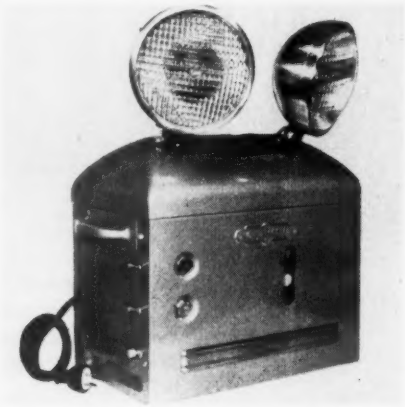
For More Details Circle No. 20—Page 214

Pyrometers: Pyrometer Service Co., 348 River Rd., North Arlington, N. J.—Newly designed line of immersion and surface type pyrometers are declared to be practically accident-proof. Four models are available:

Button type surface pyrometer, roll type of revolving surfaces, hypodermic type for soft material and the immersion type for use in molten metals. All models have heavy aluminum handles with gray krinkle finish, heavy bakelite shatterproof fan shaped doubly compensated meters, chromeplated thermocouple assembly and heat resistant connector blocks.

For More Details Circle No. 21—Page 214

Emergency Light: Carpenter Mfg. Co., Boston 45—Automatic standby light using glass jar (nonautomotive type) battery is reported to be capable of delivering 91 per cent of rated capacity after 30 minutes of use. Its extra-heavy, lead plates, patented leak-proof terminals and low specific gravity assure long shelf life with minimum maintenance, according to the manufacturer. External switches allow quick testing, other switches control the battery charger and disconnect the lampheads should unit be taken out of service. Special components withstand constantly energized condition and assure instant light during an emergency when fuses blow or power fails.



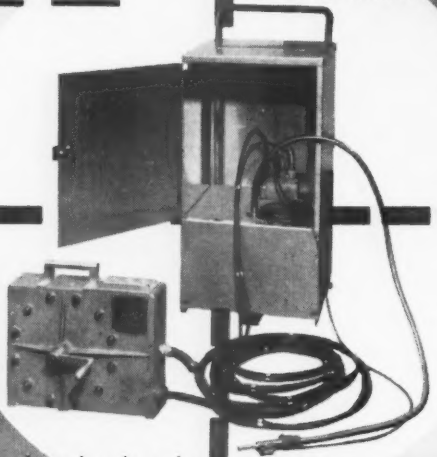
For More Details Circle No. 22—Page 214

Crucible Lining: Electro Refractories & Abrasives Corp., Buffalo, N. Y.—White alumina lined crucible for melting high-nickel-iron alloys is said to guard against possible chemical reaction and resultant metal contamination. According to manu-

(*Continued on page* 220)

Now...safe, practical gamma radiography at truly low cost

- for safe handling of strong sources
- for panoramic exposures
- for internal exposures
- for use without electric power



Technical Operations Inc. developed the P.E.S. to permit the use of strong radioactive sources in routine radiography.

With the P.E.S. safe handling of up to 4000 millicuries of Cobalt 60 is now possible. This is equal, radiographically, to 6000 milligrams of radium.

The P.E.S. can be constructed to your own specifications, if desired.

Write for Bulletin F

WITH THE NEW

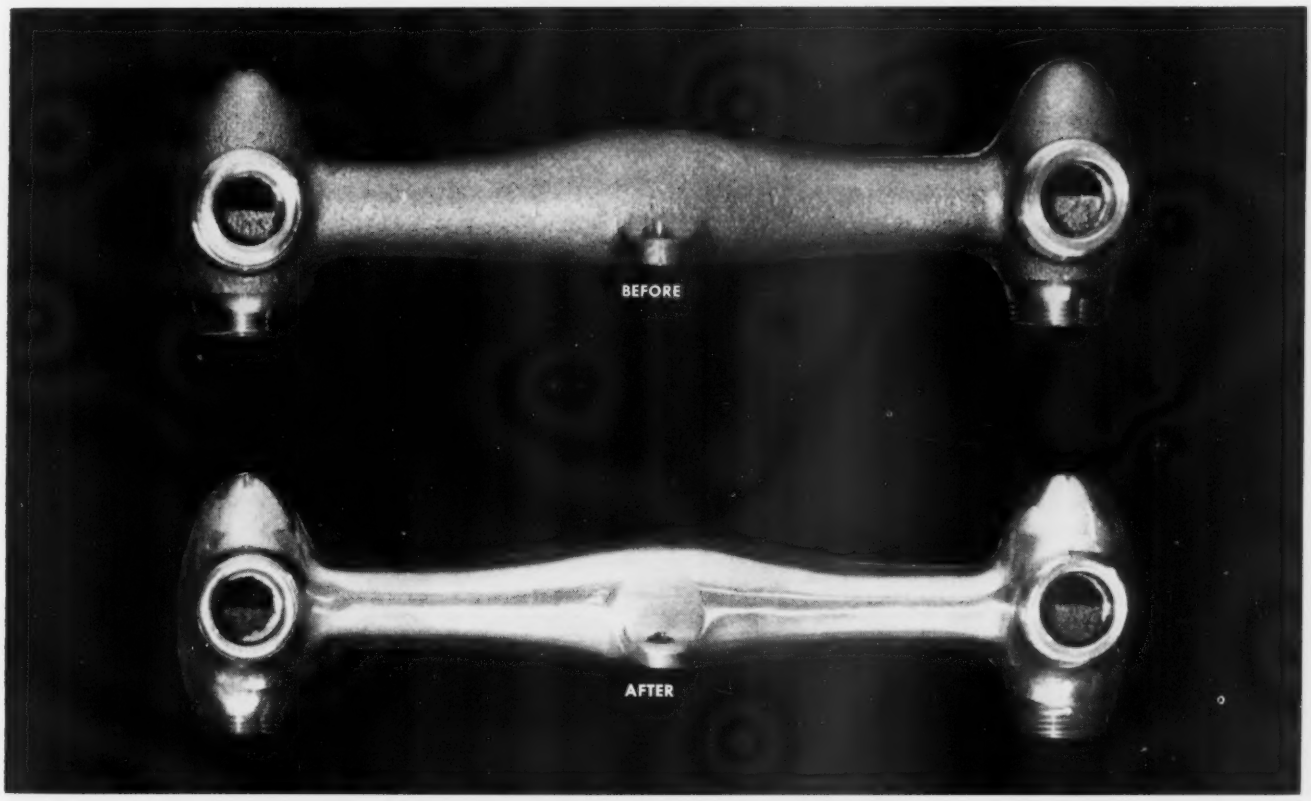
P.E.S.

PANORAMIC EXPOSURE SHIELD

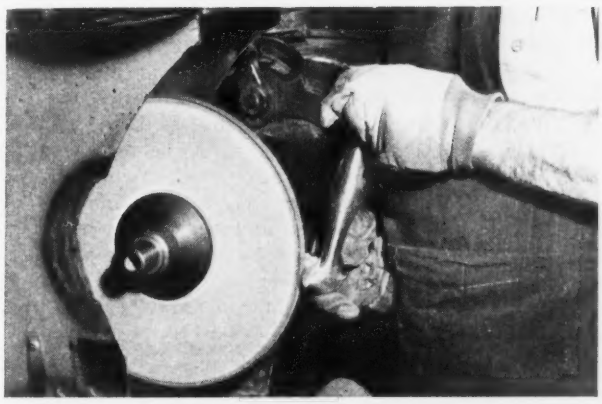
TO TECHNICAL OPERATIONS INC.

6 SCHOULER COURT, ARLINGTON 74, MASSACHUSETTS

3M METHOD — better from start to finish



St. Paul foundry increases production 60% with 3M Abrasive Belts!



80 Castings per belt! 3M Coated Abrasives are long-lasting production tools, designed to do the best possible grinding and finishing job at lowest cost to you.

Union Brass & Metal Manufacturing Co., increased production from 25 finished acorn faucets per hour to 40, when they switched to the 3M Method using "Wetordry" type belts. This manufacturer of brass plumbing fixtures formerly used set up wheels for grinding and polishing—found the wheels slow, finishes unsatisfactory. When the 3M Method was installed (using Grit #80 "Wetordry" belts for roughing, Grit #180 belts for polishing) production increased 60% with far better and more consistent finishes, less operator fatigue and greater safety.

You can benefit with 3M Coated Abrasives, too, no matter how tough your grinding or finishing problem. Your 3M Representative is an abrasives expert who can help you install or adapt your present equipment to the 3M Method. Send coupon today for facts. There's no cost or obligation.

Write Today for FREE Booklet!

Minnesota Mining and Mfg. Co.
Dept. F-74, St. Paul 6, Minn.

☐ Send me free booklet on grinding non-ferrous metals.
☐ I'd like to talk to a 3M representative.

Name_____ Title_____
Company_____
Address_____
City_____ Zone____ State_____
My distributor is_____

Made in U.S.A. by Minnesota Mining and Mfg. Co. General Offices: St. Paul 6, Minn. In Canada: London, Ont., Can. Export: 122 E. 42nd St., New York City. Makers of "Scotch" Pressure-Sensitive Tapes, "Scotch" Brand Magnetic Tape, "3M" Adhesives, "Underseal" Rubberized Coating, "Scotchlite" Reflective Sheeting, "Safety-Walk" Non-slip Surfacing.

3M COMPANY

Portable pH Meter Is Battery Powered

PORTABLE, compact, one-dial, precision, battery-operated pH meter utilizes a glass electrode and true potentiometer and incorporates a cell chain, standard cell, null circuit and electronic amplifier into a simplified circuit to provide exact measurement of very small potentials through high resistances. Batteries are said to last 1500 hr, a full year's service, and to forewarn ultimate exhaustion. They are available at any hearing aid station, and are replaceable in five minutes. Operation is assured at all times because there is no supply problem, no rectifier or filter failures, no power line dependence or interference. It is claimed to be sensitive to 0.01 pH, readable to 0.02 pH and correct to 0.05 pH within the limits of modern glass electrodes. The unit is designed for hard service and is housed in a plastic case. Coleman Instruments Inc., 318 Madison St., Maywood, Ill., is the producer.

For More Details Circle No. 24—Page 214

(*Continued from page* 218)

facturer, iron may be melted successfully also in an alumina lined crucible. The company also makes linings of fused magnesia, mullite, carbon and zircon for special applications.

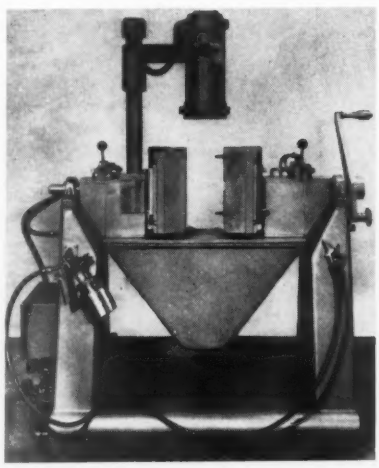
For More Details Circle No. 23—Page 214

Resin Matchplates: Bakelite Co., Division of Union Carbide & Carbon Corp., 260 Madison Ave., New York 16, N. Y.—Company's resin-based compounds are said to make accurate matchplates for green sand foundry molds and result in plate production and finishing costs savings because of low shrinkage factor. A single shrinkage allowance is claimed to be possible because of the dimensional stability of the resins. The whole matchplate, including base plate and pattern, is cast from the resin-based compound. No structural framework or internal support is needed. A number of these matchplates can be produced from one plaster of paris mold, which in turn is formed from a single-shrink master pattern. Plates reportedly resist temperature and humidity changes, industrial atmospheres, and weathering. Release from green sand assertedly is quick and easy without use of parting agents.

For More Details Circle No. 26—Page 214

Fully Cured Cores Blown in 20-40 Seconds

BLOW type shell core machine is said to produce precise, light, economical cores that vent readily and offer excellent collapsibility. They produce smooth finishes on difficult-to-machine interior surfaces. Sand-resin mix is blown or dropped (gravity-type machines also are available) from the hopper or blow head into the corebox and the excess mix returned to the hopper. Curing is done in the corebox by heater plates built into the machine. No further curing is required. Finished cores, fully cured and ready for setting, are produced in 20-40 seconds. The machine can use corebox sizes up to 9 x 12 x 6 in. deep. Special sizes made to order. Air pressure at 100 psi is used. The machine is a product of Shalco Engineering Corp., 81 Encina Ave., Palo Alto, Calif., and the Shallway Corp., South Fourth St., Connellsville, Pa.

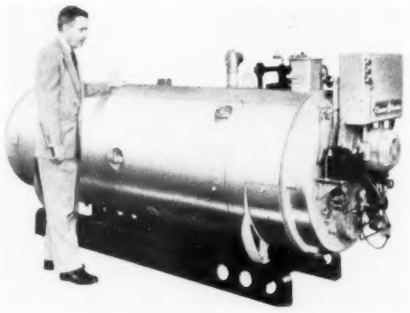


For More Details Circle No. 25—Page 214

Sling Hook: S. G. Taylor Chain Co., Hammond, Ind.—Drop forged, alloy steel, heat-treated, I-beam sling hook is said to provide additional strength and safety on chain or wire rope slings. Large eye accommodates shackle pins and wire rope thimbles. Extra area above the eye reduces wear at this point. Hooks are claimed to be resistant to shock, grain growth and work hardness. They are manufactured for ⅜, ½, ⅝, ¾, ⅞, 1, and 1⅛-in. chain sizes.

For More Details Circle No. 27—Page 214

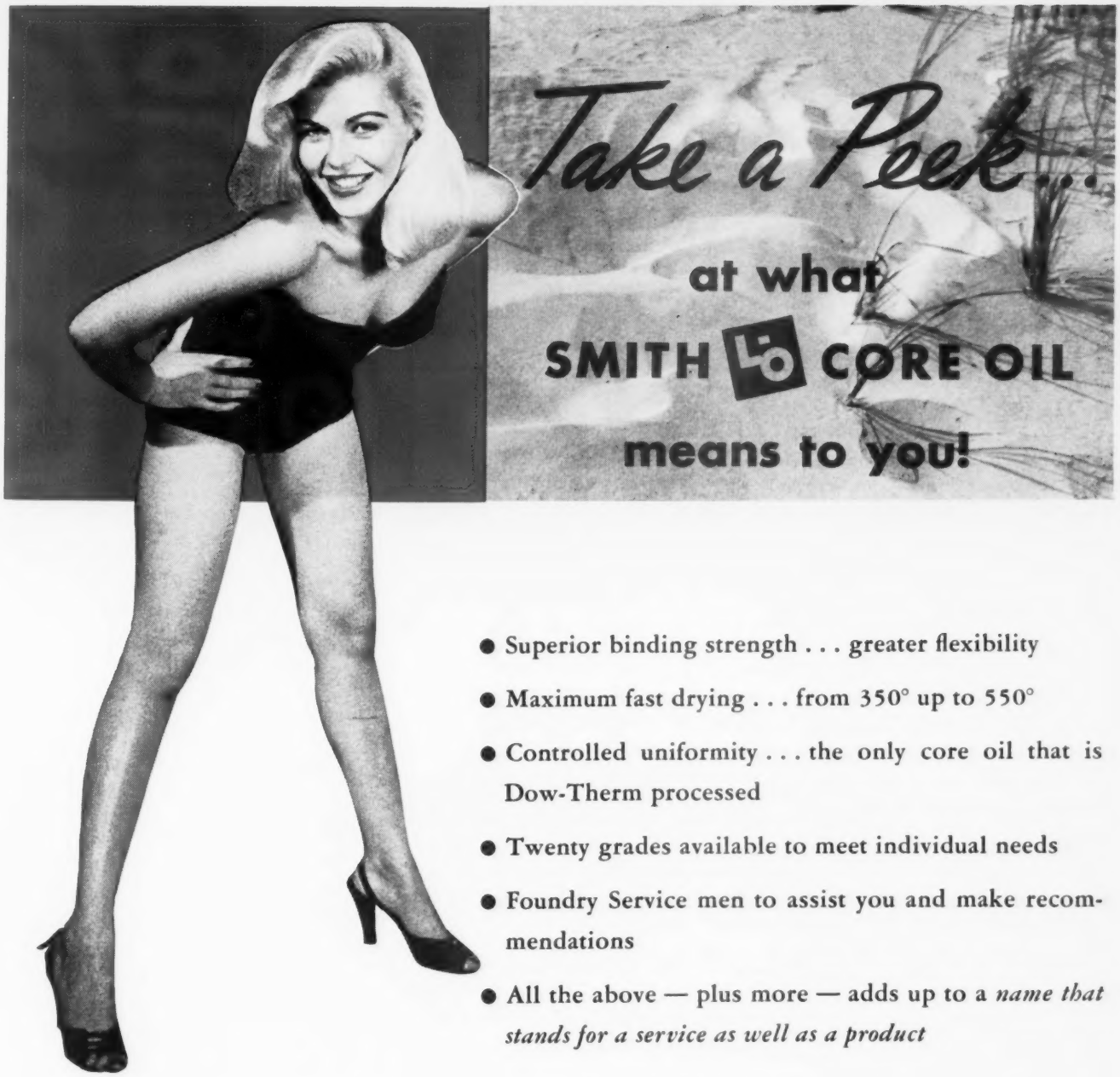
Boiler: Cleaver-Brooks Co., 326 East Keefe Ave., Milwaukee 12—Compact, self-contained boiler for processing or heating, steam or hot water use is said to offer big boiler performance even though it is of 15 to 40 hp capacity. The boiler operates silently, burns light oils or gas and can be converted from one to the other in less than a minute. It employs safety control features, and operation and maintenance are aided by easy-to-open hinged doors on front and rear. Heat absorption is gained by four-pass construction and minimum efficiency of 80 per cent is guaranteed when oil-fired.



For More Details Circle No. 28—Page 214

Bronze Electrode: Eutectic Welding Alloys Corp., 40-40 172nd St., Flushing 58, N. Y.—Bronze electrode produces copper-base deposits alloyed with silicon, manganese and chromium for high-strength joining and for frictional and corrosion resistance on a wide variety of base metals. The electrode is recommended for joining and overlaying steel, cast iron and copper alloys. It also is claimed to be excellent for various combinations of ferrous and nonferrous metals including stainless steel, nickel and nickel alloys. Manufacturer asserts

(*Continued on page* 222)



- Superior binding strength . . . greater flexibility
- Maximum fast drying . . . from 350° up to 550°
- Controlled uniformity . . . the only core oil that is Dow-Therm processed
- Twenty grades available to meet individual needs
- Foundry Service men to assist you and make recommendations
- All the above — plus more — adds up to a *name that stands for a service as well as a product*

SMITH REPRESENTATIVES

- COLUMBIAN WAREHOUSE CO. Reading, Pennsylvania
- FOUNDRIES MATERIALS CO. Coldwater, Michigan
- FOUNDRY SERVICE CO. Birmingham, Alabama
- F. F. SHORTSLEEVE Elmira, New York
- MALCOLM G. STEVENS Arlington, Massachusetts
- PACIFIC GRAPHITE CO., INC. Los Angeles 22, California
- ST. LOUIS COKE & FOUNDRY SUPPLY CO. St. Louis, Missouri
- WESTERN FOUNDRY SAND CO. Seattle, Washington
- WESTERN INDUSTRIAL SUPPLY CO. Portland 14, Oregon

Smith L-O Core Oil

ROD DIP LIQUID PARTING

SMITH OIL & REFINING CO.

MANUFACTURERS OF L-O AND CERTIFIED CORE OILS
INDUSTRIAL OILS DIVISION • ROCKFORD, ILLINOIS

(*Continued from page* 220)

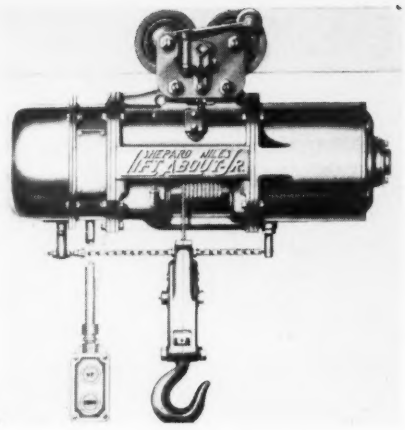
the electrode is noncracking, fully machinable, minimizes warpage and distortion of the parent metal, gives twice the wear resistance of phosphor bronze and has a tensile strength up to 90,000 psi, according to the base metal upon which it is used.

For More Details Circle No. 29—Page 214

Phone Booth: Burgess - Manning Co., Architectural Products Division, 5970 Northwest Highway, Chicago—This doorless telephone booth is claimed to reduce the loudness of outside noise by 50 per cent. It is all-metal construction with thick layers of sound-absorbing material that trap extraneous noises before they can interfere with telephone conversations. Triangular in shape, the booth is designed to be placed against walls, or corners, in multiple installations in line or as a circular island.

For More Details Circle No. 30—Page 214

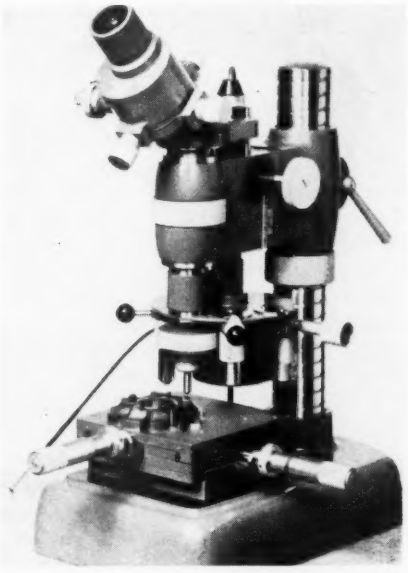
Wire Rope Hoist: Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.—Light-service, quick-action wire rope hoist is offered for intermittent duty. It is available in ¼ to 1-ton capacities with either ac or dc



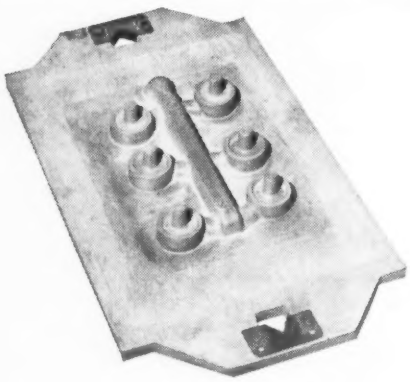
motors. Hoist can be supplied with collectors for regular conductor systems or with a tag line, and can be furnished either parallel or cross mounted, with bolt, hook or trolley suspension. Speeds range from 12 to 25 fpm on dc-operated types and 20 to 37 fpm on ac units. Maximum lift is 16 ft on hook suspension units, 20 ft on all other frame sizes. Additional features include a safety type load block with fully enclosed sheave, weather-proof enclosures, and oil bath lubrication.

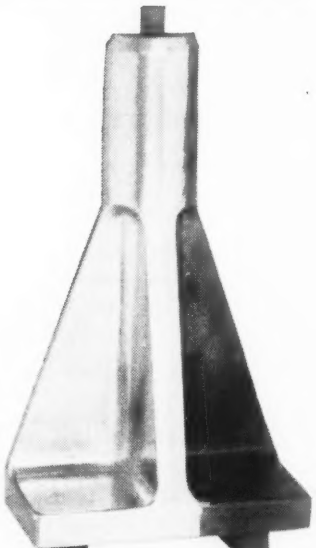
For More Details Circle No. 31—Page 214

Hardness Tester: George Scherr Co., 200 Lafayette St., New York 12—Portable bench type micro-hardness tester combines positive controlled



diamond penetrating action claimed to make only the most minute scratches or impressions on the finest of finishes. The instrument combines controlled penetrating action with a high-power microscope of 400 magnifications. The microscope is swung directly over the impression to read the hardness by measuring with a reticule scale and vernier in 0.0005-mm, resulting in hardness readings of





Make Your WOOD and CAST STONE Patterns work like METAL With —

MABCO ALUMINUM PATTERN PAINT AND PLASTIC

And at a fraction of the cost!

The Photographs show how you can have patterns that work like metal at as little as ONE-FOURTH the cost of metal patterns. Note the Cast Stone Match Plate above (left) coated with one thin coat of MABCO PATTERN PAINT. No finishing was attempted nor was it required to put the pattern into production.

Check the following features —

- √ Quick dry, paint-on metallic Aluminum coating which may be SANDED, FILED OR MACHINED when dry.
- √ May be used to build up or revamp metal or wood patterns
- √ Hot sand does not stick to coating.
- √ Impervious to moisture and most solvents.
- √ Is not affected by synthetic binders.

NOTE The solvent for MABCO PATTERN PAINT and MABCO ALUMINUM PLASTIC is MABCO THINNER.

Use no other solvent since the binder will not release ordinary solvents, rendering the material useless.

M. A. BELL COMPANY

217 Lombard St. • St. Louis, Mo.

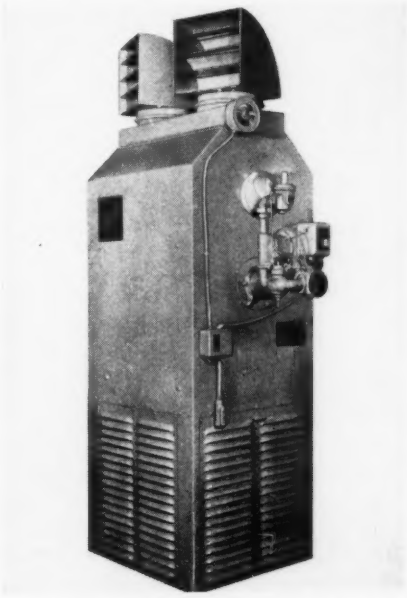
"Serving the foundry industry for over 25 years"

HOUSTON DENVER

precision in half a micron (0.0005 mm). Tables are furnished converting readings into Rockwell and other standard hardness scales.

For More Details Circle No. 32—Page 214

Space Heaters: Dravo Corp., Heating Dept., Machinery Division, 1203 Dravo Bldg., Pittsburgh 22—Two gas-fired warm air space heat-



ers with capacities of 200,000 and 225,000 Btu per hour and suitable for natural, manufactured or mixed gases and liquefied petroleum have been added to the company's line of oil-fired heaters. Self-contained, gun type, flange-mounted gas burner incorporates a combustion air fan driven by a ¼-hp resilient mounted motor. It is equipped with a thermoelectric safety pilot. A shut-off valve on the motor shaft, fool-proof safety pilot and electrically ignited gas pilot are other features. The air-circulating fan is interlocked with the burner and other automatic features shut down the burner in case of flame, power or motor failure.

For More Details Circle No. 33—Page 214

Welding Hose Reel: United Specialty Corp., P.O. Box 698, El Dorado, Ark.—Welding hose reel is capable of handling 50 ft of dual welding hose, requires 21 x 27 in. of space, and can be attached to any type portable or stationary equipment. Reel locks hose in position at any desired length and automatically retracts hose when not in use.

For More Details Circle No. 34—Page 214

Crane Scale: Harnischfeger Corp., Overhead Crane Division, 4400 West National Ave., Milwaukee 46—Electronic scale is reported to provide accurate weighing service for any type of load while it is being handled, thereby eliminating the need for a

Crescent Chaplets

FUSE-TITE

While we have just about every size and type of chaplet you can think of, there is a *possibility* that we don't have the *exact type* you require. In that case, we can design and develop *just the chaplet* to suit your requirements! We have all sorts of working samples available, and are always ready to ship them in a hurry to those who wish to try them.

A FEW OF OUR SPECIALTIES

- RADIATOR CHAPLETS
- SHOULDER CHAPLETS
- BOILER CHAPLETS
- DOUBLE HEAD CHAPLETS
- MOTOR CHAPLETS
  Regular or Extended Stems
- TIN TUBES
- CHAPLET NAILS
  Plain, Nicked or Barbed
- SKIM GATES
- CORE WIRES
- CORE TINS & SHIMS
- TAPER DRIVE PLUGS

Crescent FUSETITE CHAPLETS are accurately made of proper analysis materials for the fusing-in process. We have been devising and supplying chaplets since 1889, and our stocks are amazingly ample and varied. We originated Radiator, Shoulder, Double Head and Motor Chaplets, and if necessary, we can originate Special Chaplets for YOU.

WRITE FOR SAMPLES AND PRICE LIST

★

CRESCENT BRASS & PIN CO.

5766 TRUMBULL AVE. DETROIT 8, MICHIGAN

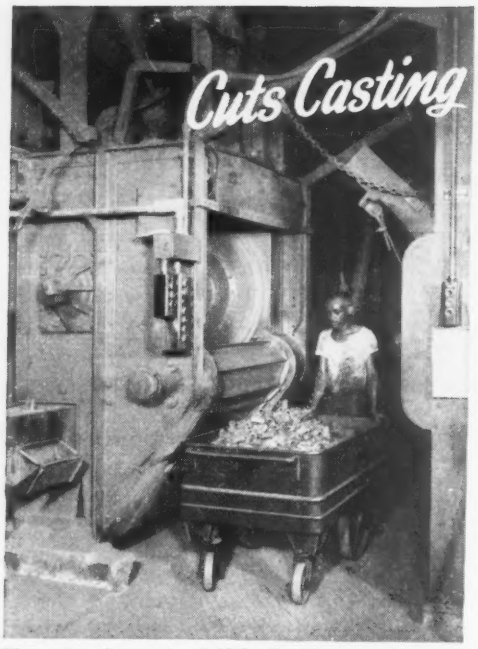


Illustration shows one of 25 Sterling Heavy Duty Trucks in daily use at the Green Foundry, St. Louis, Mo.

Cuts Casting Handling Costs!

Sterling Heavy Duty All-Steel Trucks are ideal for transporting castings from Wheelabrator, Roto Blast or similar equipment. 2000 lbs. capacity. Reduces number of loads required. Saves both time and labor. Height is adjustable to accommodate discharge door. Roller bearing wheels and ball bearing swivel casters increase maneuverability. Sturdy, reinforced welded construction.

Investigate how these heavy duty Sterling Trucks can cut your casting handling costs. Write today.

STERLING WHEELBARROW CO.
Milwaukee 14, Wisconsin, U. S. A.

Sterling
FOUNDRY EQUIPMENT

A 5656-1/3

Extra N.& F. Silo assures against coal shortage

To avoid running out of coal in the event of delivery failure, a Michigan manufacturer had us erect two 18 x 60 ft. silos. One of them is kept filled with a reserve supply of 381 tons. Then, if trains or trucks become snowbound, the plant doesn't have to shut down as had frequently happened in the past.

This is a splendid idea for users of all kinds of flowable bulk materials—extra storage space for emergencies. The additional cost is trivial in relation to the loss occasioned by work stoppage.

And, of course, Neff & Fry Silos are the storage bins to use on account of their many advantages.

It will pay you to know the facts.

Descriptive literature is yours for the asking. You won't be subjected to personal solicitation by requesting literature.

(Not exported except to Canada and Mexico.)

THE NEFF & FRY CO. • 214 Elm St., Camden, Ohio

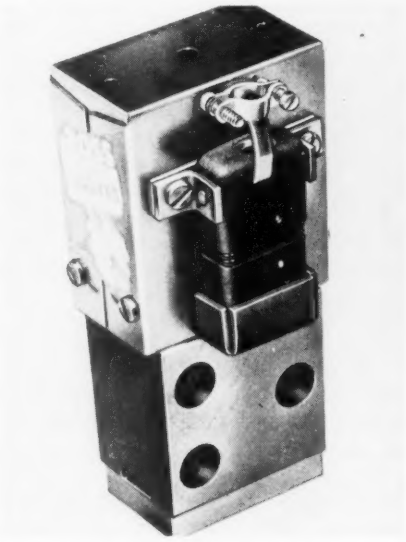
NEFF & FRY SUPER-CONCRETE STAVE STORAGE BINS

separate weighing operation. Weight is brought to bear upon a load cell built into the load block. An electric signal is transmitted through a cable and a brushless type cable reel to

the recording instrument, which may be of visual or recording type mounted in the crane cab or other location. Scale may be used on any crane and is available in capacities up to 200 000 lb.

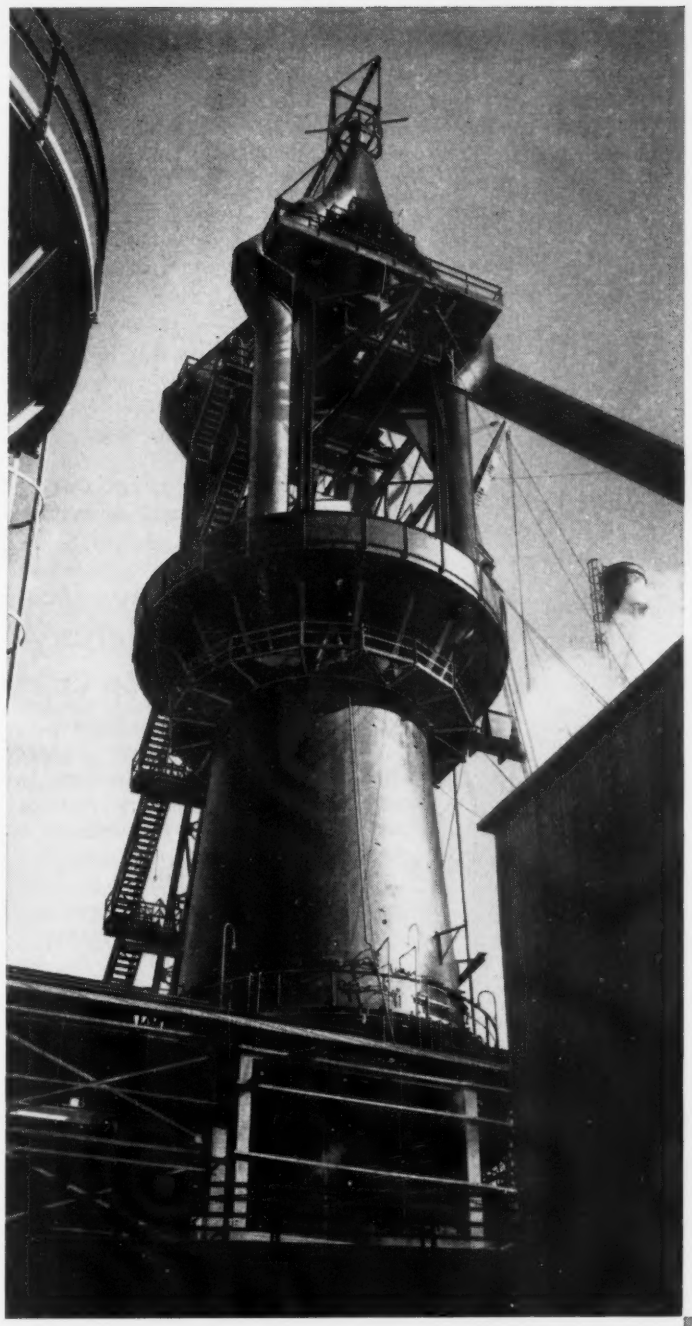
For More Details Circle No. 35—Page 214

Air Control Valve: Ross Operating Valve Co., 134 East Golden Gate Ave., Detroit—Four-way, two position direct solenoid operated air con-



trol valve measures 2 x 2¼ x 5 in. and weighs 2½ lb but is capable of operating at 800 or more cycles per minute. It may be mounted directly on welding guns, small jigs and fixtures, small bench machines and similar equipment. It has only one moving part and maintenance thus is simplified. The valve is available in manifold, sub-base, plate mounting and inline pipe-tapped body types.

For More Details Circle No. 36—Page 214



MELTRITE

PIG IRON

Distribution
From Five Strategically Located Plants

■

MORE USED THAN ANY OTHER MERCHANT PIG IRON

■

Foundry Service Department available without obligation

This new Erie Furnace is part of a program of plant expansion completed last year.

With greatly increased productive capacity, we are serving industrial America from five favorably located plants in Erie, Toledo, Chicago, Duluth.

PICKANDS MATHER & COMPANY

Union Commerce Building • Cleveland 14, Ohio

Chicago • Cincinnati • Detroit • Duluth • Erie
Grand Rapids • Greensboro • Indianapolis • Minneapolis
St. Louis • Washington

IRON ORE • PIG IRON • COAL • COKE

Manufacturers Hold Paris Conference

American delegates to the Second International Conference of Manufacturers, which was held in Paris May 23-25, comprised 162 leading industrialists representing a cross section of industry. Sponsored by the Council of European Industrial Federations, the conference brought together for discussion of the western world's economic problems, 325 outstanding representatives from both sides of the Atantic.

Individuals identified with the foundry and allied industries in the United States delegation included: Wayne I. Belden, Ajax Flexible Coupling Co., Westfield, N. Y.; S. D. Den Uyl, Bohn Aluminum & Brass Corp., Detroit; Thomas J. Frank, Frank Foundries Corp., Davenport, Iowa; William J. Grede, Grede Foundries Inc., Milwaukee; W. H. Hipsher, Mueller Co., Decatur, Ill.; George F. Kohn, Precision Grinding Wheel Co., Philadelphia; Ralph C. McCague, Kiowa Corp., Marshalltown, Iowa; Hamilton Merrill, Manning, Maxwell & Moore Inc., Stratford, Conn.; Gustav Nyselius, Mt. Vernon Die Casting Corp., Stamford, Conn.; C. J. O'Connor, Reichhold Chemicals Inc., Detroit; Charles F. Seelbach, Forest City Foundries Co., Cleveland; Denton K. Swartwout, Swartwout Co., Cleveland; Clarence Tolan Jr., Dodge Steel Co., Philadelphia; Jervis C. Webb, Jervis B. Webb Co., Detroit; George L. Weissenburger, Keokuk Electro-Metals Co., Keokuk, Iowa; and J. B. Woodward Jr., Newport News Shipbuilding & Dry Dock Co., Newport News, Va.

The American delegation was organized by the National Association of Manufacturers.

DUREX

"DUROX" and "D • SAVAGE"
Standard Fire Brick Products
Proven by Actual Foundry Service

FIRE CLAY
FIRE BRICK
BONDING CLAY
DUREGAN

AIR-PLACEMENT GUN
FOR CUPOLA MAINTENANCE OR ELECTRIC FURNACE LININGS

The most economical and efficient air-placement gun. Ruggedly built for years of service with minimum repairs. Installation, demonstration and training to your own men by our own engineers.

"DUREGAN" SUPER-DUTY PRODUCT — BAG OR BULK

"Duregan" can be used in all types of guns on the market today. It is carefully screened and sized to insure maximum density with minimum rebound. All quartz particles thoroughly coated to assure a strong bonded lining and long-life refractory service.

DUREX REFRACTORIES CO. JACKSON, OHIO
Phone: Jackson 109
5252 Broadway, Chicago, Ill. Phone: Uptown-8-1322

Mark 50th Anniversary At U.S. Reduction Co.

Celebrating its 50th anniversary, U. S. Reduction Co., East Chicago, Ind., has published a brochure recalling the founding of the organization and tracing its development to the present time.

The firm was established in April, 1904, by Henry Lindenberger and Leo Wenk. Today it has plants in East Chicago and in Toledo, O., and its furnaces have capacities up to 75,000 lb daily. Whereas the company produced only two aluminum products in its early days, it now offers over 40 standard aluminum alloys plus at least 140 others to special specifications. Edwin A. Bergman now is president.

OBITUARY

ARTHUR J. WESTPHAL, 60, vice president-sales and secretary, Atlas Steel Casting Co., Buffalo, died May 11 from injuries suffered in an automobile accident near Erie, Pa., while returning from a business trip. Mr. Westphal, one of the company's oldest employees, joined Atlas when it was founded in 1912.

* * *

William M. Carty, 72, formerly associated with Standard Brake Shoe & Foundry Co., Pine Bluff, Ark., died May 19. Mr. Carty retired 8 years ago.

* * *

Alfred Beaumont, 86, since 1905 owner of Alfred Beaumont Foundry & Machine Works, Kankakee, Ill., died May 14.

* * *

John L. Fisher, 66, owner and operator of Fisher Brass Foundry, Vernon, Calif., died May 30.

Small Foundry Mechanizes

(*Continued from page* 83)

table of the blast cabinet.

Blasted castings are unloaded from these machines to four-sided tote boxes mounted on wheels and pushed to the grinders. After grinding, castings are put in similar wheeled boxes and pushed to another section of the cleaning department where they are inspected, brinell tested when necessary and piece counted or weighed. Depending upon their type, the castings are palletized or put in shipping boxes and loaded by electric fork trucks into transport trucks which back up to large doors at one side of the cleaning department. An air-cylinder-operated dock leveling device facilitates movement of the lift truck from shipping platform to transport truck.

Other equipment in the cleaning department consists of four double-end stand grinders which are hooded, a number of benches where pneumatic hand grinding operations are performed and four tumbling barrels.

Sand Moved By Conveyor

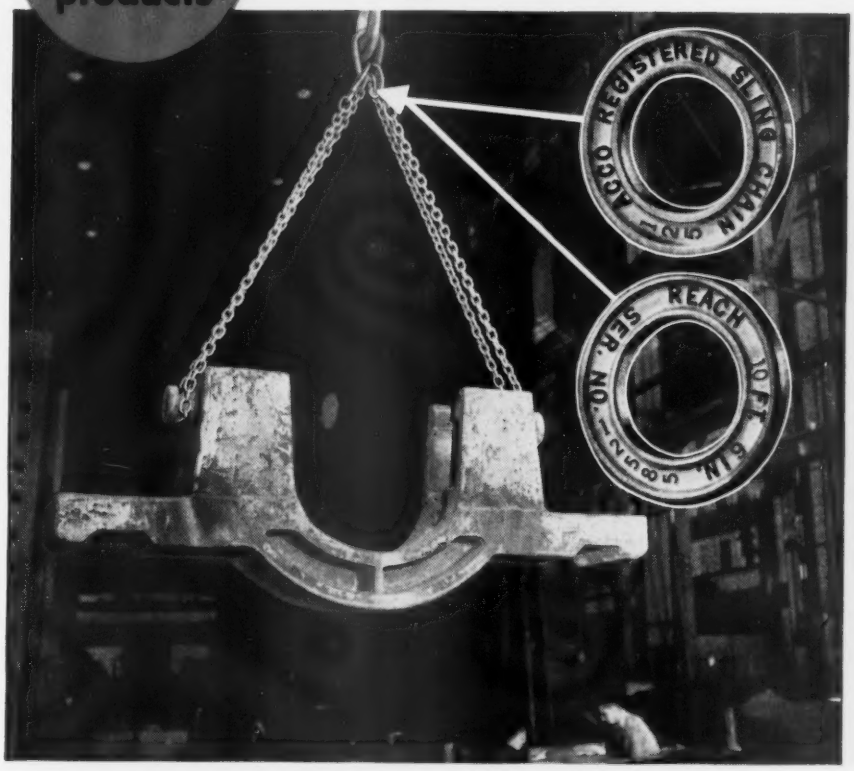
Sand from the shakeout is picked up by a 68-ft-long belt conveyor and carried out of the pit and up near the sand storage hoppers. Tramp iron is removed by a magnetic head pulley, the sand falling to a vibrating screen. Lumps are shaken off the screen to a tote box, and when full, it is removed by fork truck. Sand falling through the screen is carried by chute to a bucket elevator which feeds an overhead belt conveyor. This conveyor fills either of two 60-ton capacity storage hoppers depending on the position of a manually set plow.

Dry sand is stored in two silos at one end of the coremaking section, each with 120 tons capacity. One holds Lake Michigan sharp sand and the other Juniata bank sand. Gated chutes at silo bottoms feed directly to a skip hoist which dumps into a 300-lb capacity muller. Core oil is pumped in from a 10,000-gal storage tank buried in the yard and metered into the muller. Water additions also are metered.

The regular core mix, used for small and medium size cores, consists of 370 lb of sand, 6 pt cereal binder, 5 pt core oil and 2½ pt water for the blow machine mix or 3 pt for roll-over and hand work. For heavier cores, ranging from 60 to 70 lb, the same mix is used with an additional pint each of oil and water plus 3 pt of iron oxide. When chunk cores are being made, the basic mix is altered by eliminating the 5 pt of regular core oil and substituting 3 pt of

ACCO products

ACCO Registered* Sling Chains



What would it cost you if you dropped this casting?

• How many times a day do you gamble with a heavy load being lifted over expensive machines—or men? If you have ever dropped a load, you know the consequences. Time lost, damages—a general mess.

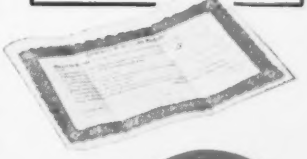
That's why you must be sure of the slings you use. That's why we suggest ACCO *Registered* Sling Chains with their inherent safety. For instance, a ⅜" double ACCO *Registered* Sling Chain used as a double-basket at a 60° angle has a working load limit of 11,400 pounds, almost six tons! Furthermore—it was proof-tested—overall—with a load equivalent to *twelve tons.*

With all this strength, ACCO *Registered* Sling Chains are light in weight . . . easy for your men to handle. That's because they're made of alloy chain which provides strength, great strength, with less weight.

There's much more to tell about these fine ACCO *Registered* Sling Chains. Call your ACCO *Registered* distributor today or write us for literature.

WHAT "ACCO REGISTERED" MEANS . . .

1 The best material
2 Unit safety factor (on bodies, rings, links, hooks)
3 Proof test of complete sling to twice the working load limit
4 Actual field service test of each design
5 Metal identification ring on each sling
6 Signed Registry Certificate with each sling



*Trade Mark Registered

ACCO
TRADE MARK

American Chain Division
AMERICAN CHAIN & CABLE

York, Pa., Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, Ore., San Francisco, Bridgeport, Conn.

plus Rings Links Hooks

some type of fast baking oil.

Mulled sand is dumped into a 400-lb capacity bottom-gated bucket mounted on an electric walkie lift truck. Bucket is lifted hydraulically and can clear an obstacle 10 ft high to dump its load. Sand is dumped directly into coreblower hoppers or onto coremakers' benches.

Coreroom is equipped with four floor-mounted coreblowers, one bench-mounted blower, three hand jolt rollovers and a number of benches for hand work. Machines and benches are aligned along a slider conveyor belt leading to a stoker coal-fired recirculating tower oven. Cores are baked in aluminum driers or on asbestos cement core plates at 420 to 440°F. Average baking cycle is 1 hr, 23 minutes to 1 hr, 47 minutes. Some large, chunky cores are run through twice to obtain a complete bake.

Baked cores are unloaded to a roller conveyor and picked off to any of six tables, three located on each side of the conveyor. Rubbing and pasting operations are performed at the tables. Paste is applied to core surfaces by an electrically driven steel roll which revolves in a pan of paste. The core is touched to the face of the roll to receive its coating of paste. Some core assemblies are sprayed with a wash, and for that purpose are set out on the floor and a hand spray gun used. Finished cores are loaded onto racks or skids, depending upon their size, and transported by walkie electric platform lift truck to molders.

Melting is done in two front slagging cupolas lined to 44 in. and used on alternate days. They are equipped with an air-weight control which feeds 3100 cfm of air at 10 oz pressure to the cupolas. Melting is at the rate of 5 to 7 tons per hour, and metal is tapped at 2800-2850° F into a 3000-lb capacity mixing ladle, from which mold-pouring ladles are supplied. Pouring ladles are preheated by oil-fired burners adjacent to the cupolas.

Gray iron poured at Auburn contains 3.30-3.40 C, 2.15-2.25 Si, 0.70-0.80 Mn, 0.15 max P and 0.15 max S. Chill tests are made every 10 minutes, brinell test bars are poured four times a day and a sample bar is sent daily to a local laboratory for analysis.

Although the company makes none of its own patterns, it maintains a small shop equipped with the usual power and hand tools for repairing wood patterns and constructing gating set-ups.

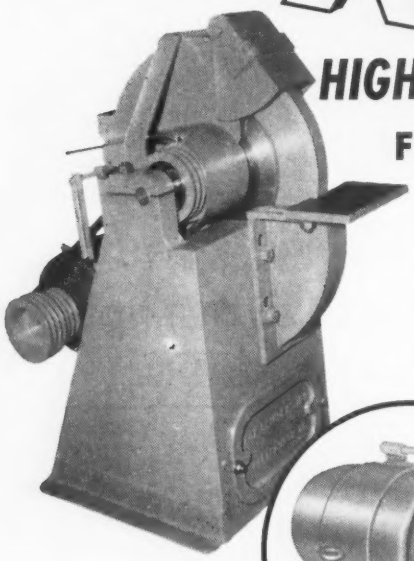
Air cleaning equipment in the foundry is as modern as production equipment. A wet-type dust collector with precleaner removes dust from air caught at the shakeout and molding sand muller. A bag-type cleaner handles the dusty air from grinders and tumble-blast and table-blast machines in the cleaning room. Hoods over the oscillating pan conveyor are piped to roof fans and the air exhausted directly to the outside atmosphere. Fans also are located in roof openings over the pouring floors of the squeezer and slinger sections. They change air in the foundry every 1½ minutes, fresh air being admitted by open windows and normal building leakage. Heat is supplied in the foundry areas by overhead steam heat-blower units.

Clark Forms Subsidiary

Clark Equipment Co., Buchanan, Mich., has formed a new subsidiary, Clark Leasing Corp., to finance leasing of its equipment on a national basis. Establishment of the subsidiary follows a six-month test period during which Clark leased more than $2 million worth of industrial trucks under a bank-financed arrangement.

FOX

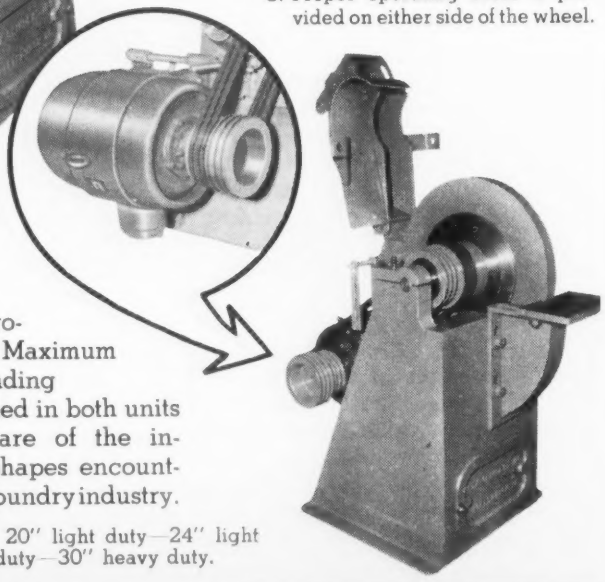
HIGH-SPEED STAND GRINDERS



HIGH-SPEED PRODUCTION FOR THE FOUNDRY

Three important reasons why FOX Grinders are designed as single-wheel machines:

1. Speed changes can be made at the proper wheel diameter.
2. Less space is required for each installation.
3. Proper operating room is provided on either side of the wheel.



These Stand Grinders have been designed for use in foundries where high-speed production is required. Maximum clearance at the grinding face has been provided in both units to properly take care of the innumerable casting shapes encountered throughout the foundry industry.

Comes in 4 sizes: 20" light duty—24" light duty—24" heavy duty—30" heavy duty.

FOX GRINDERS, Inc.

OLIVER BUILDING PITTSBURGH 22, PA.

Why you can count on NATIONAL for better bonded molds . . .

Many good foundrymen have known, for years, that National Bentonite helps them bond a better mold because of these important qualities: consistently uniform high quality . . . good green strength . . . high hot strength . . . high tensile strength . . . high sintering point . . . good mold durability . . . and close laboratory control. They know, too, it yields high permeability, provides high deformation, and requires least water to temper correctly. This all means better production, fewer rejects, and less time in the cleaning room.

Baroid

Quick service from better foundry suppliers everywhere

Baroid Sales Division ☆ National Lead Company

Bentonite Sales Office: Railway Exchange Building, Chicago 4, Illinois

4722

500,000 castings without a reject by using RESINOX 1128 bonded shells

That's the record of Midwest Foundry Co., Coldwater, Michigan

Gray iron is poured into 34 molds from one ladle as they pass on a conveyer belt. Permeable sand-Resinox 1128 shell molds permit gases to escape, eliminate many metallurgical defects such as blowholes, porosity and cold shuts.

Half a million items, cast to a tolerance of .010" without a single reject . . . labor costs reduced more than half . . . 12 pounds of finished product for every 15 pounds of metal poured . . . elimination of machining on intricate designs . . . 20% lighter molds, on the average . . . up to 4 times more production per man hour—these shell molding advantages reported by Midwest Foundry Company are typical of those experienced by foundries throughout the country.

"We are producing a cylinder liner with thin vertical walls demanding very close tolerances, by shell molding with Monsanto Resinox 1128," reports Mr. Albert H. Doerr, Chief Engineer. "The high flow characteristics of Resinox 1128 combined with the integral core features of shell molding give us high quality finish, clean stripping and closer dimensional tolerances than with any other combination . . . and we are getting these results with an exceptionally low 5% resin-to-sand ratio."

The success of the shell molding process is heavily dependent on the quality of the resins used. That's why more and more foundries are specifying Monsanto *Resinox* shell molding resins to get consistently better castings at lower cost. You'll find that research-proved and shop-tested Monsanto foundry resins will meet your most exacting production requirements.

For complete information on Resinox shell molding resins, phenolic and Resimene urea resins for core binding, and Lytron sand conditioner for conventional sand casting, mail the convenient coupon today. Resinox: Reg. U. S. Pat. Off.

MONSANTO CHEMICAL COMPANY, Plastics Division, Room 5706, Springfield 2, Mass.

Please send me complete information on:

☐ Resinox shell molding resins; ☐ Monsanto phenolic resins; ☐ Monsanto core binding resins; ☐ Lytron sand conditioner.

Name & Title

Company

Address

City, Zone, State

MONSANTO®

SERVING INDUSTRY...WHICH SERVES MANKIND

Proposed Revised Tentative Definitions of

Terms Relating to Methods of Mechanical Testing

ASTM Designation: E 6—
Issued, 1954

1. These definitions cover the principal terms relating to methods of mechanical testing. The general definitions are restricted and interpreted when necessary to make them particularly applicable and practicable for use in standards requiring or relating to mechanical tests. These definitions are published to encourage uniformity of terminology in product specifications.

Note. At present these definitions are based primarily upon practices pertaining to the testing of structural materials. As rapidly as agreement can be reached the definitions will be expanded to cover other materials.

Index of Terms

2. The definitions appear in the following sections:

Term	Section
Brinell Hardness Number	3(o), Item (1)
Compressive Strength	3(j)
Diamond Pyramid Hardness Number	3(o), Item (3)
Elasticity, Modulus of	3(f)
Elastic Limit	3(e)
Elongation	3(m)
Gage Length	3(l)
Hardness	3(o)
Indentation hardness	3(o)
Modulus of Elasticity	3(f)
Proportional Limit	3(d)
Reduction of Area	3(n)
Rockwell Hardness Number	3(o), Item (2)
Shear Strength	3(k)
Strain	3(b)
Stress	3(a)
Stress-Strain Diagram	3(c)
Tensile Strength	3(i)
True Stress	3(a), Note 3
Yield Point	3(g)
Yield Strength	3(h)

Definitions

3. (a) Stress—The intensity at a point in a body of the internal forces or components of force which act on a given plane through the point. Stress is expressed in force per unit of area (pounds per square inch, kilograms per square millimeter, etc.). As used in product specifications, stress is calculated on the basis of the original (Note 1) dimensions of the cross section of the specimen.

Note 1. In this and other definitions in this standard, "original" refers to dimensions, area, etc., of specimens before beginning of testing and under conditions prevailing when the test measurements are made.

Note 2. The stress or component of stress acting perpendicular to a given plane is called the normal stress. A normal stress may be either a tensile or a compressive stress depending upon the nature of the force. The stress or component of stress acting tangential to the plane is called the shearing stress.

Note 3. "True stress" differs from stress as defined previously in that it is calculated from the instantaneous rather than the original area.

(b) Strain—A measure of the change in size or shape of a body, due to force, referred to its original size or shape. Strain is a non-dimensional quantity but it sometimes is expressed in inches per inch, etc.

Note. Strains may be either linear—tensile strain or compressive strain, or angular—shear strain. In the ordinary tensile, compressive or torsional test, it is usual to measure only one component of strain and to refer to this as "the strain". A linear strain is defined as the change per unit of length in an original linear dimension. A shear strain is defined as the tangent of the angular change between two lines originally perpendicular to each other.

(c) Stress-Strain Diagram—A diagram in which corresponding values of stress and strain are plotted against each other. Values of stress usually are plotted as ordinates (vertically) and values of strain as abcissas (horizontally).

(d) Proportional Limit—The greatest stress which a material is capable of developing without any deviation from proportionality of stress to strain (Hooke's Law).

Note. Many experiments have shown that values of proportional limit vary greatly with the sensitivity and accuracy of the testing equipment, eccentricity of loading, the scale to which the stress-strain diagram is plotted and other factors. When determination of proportional limit is required, the procedure and the sensitivity of the test equipment should be specified.

(e) Elastic Limit—The greatest stress which a material is capable of developing without any permanent strain remaining upon complete release of the stress.

Note. Due to practical considerations in determining the elastic limit, measurements of strain, using a small load, rather than zero load, are usually taken as the initial and final reference.

(f) Modulus of Elasticity—The ratio of stress to corresponding strain below the proportional limit. Modulus of elasticity, like stress is expressed in force per unit area (pounds per square inch, etc.). As for stress, there is a modulus of elasticity in tension, in compression and in shear.

Note. The stress-strain relations of many materials do not conform to Hooke's Law throughout the elastic range but deviate therefrom even at stresses well below the elastic limit. For such materials the slope

of either the tangent to the stress-strain curve at a low stress, or the secant connecting two points on the stress-strain curve at prescribed stresses is usually taken to be the modulus of elasticity. In these cases the modulus should be designated as either the "tangent modulus" or the "secant modulus" and the stress or stresses stated.

(g) Yield Point—The first stress in a material, less than the maximum attainable stress, at which an increase in strain occurs without an increase in stress.

Note. It should be noted that only materials that exhibit this unique phenomenon of yielding have a "yield point".

(h) Yield Strength—The stress at which a material exhibits a specified limiting deviation from the proportionality of stress to strain.

Note. Because it is usually impractical and probably impossible to determine the stress at which inelastic action begins, it is customary to determine the yield strength by:

(a) the offset method (usually 0.2 per cent), or

(b) the total extension under load method (usually 0.5 per cent).

Whenever yield strength is specified, the method of test must be stated along with the per cent offset or the total strain under load. The values obtained by the two methods may differ.

(i) Tensile Strength—The maximum tensile stress which a material is capable of developing. Tensile strength is calculated from the maximum load carried during the tension test and the original cross-sectional area of the specimen.

Note. In practice, it is considered to be the maximum stress developed by a specimen representing the material in a tension test carried to rupture, under definite prescribed conditions.

(j) Compressive Strength—The maximum compressive stress which a material is capable of developing, based on original area of cross section.

Note. In the case of a material which fails in compression by a shattering fracture the compressive strength has a definite value. In case of materials which do not fail in compression by a shattering fracture the value obtained for compressive strength is an arbitrary value depending upon the degree of distortion which is regarded as indicating complete failure of the material.

(k) Shear Strength—The maximum shearing stress which a material is capable of developing, based on original area of cross section.

(l) Gage Length—The original length of that portion of the specimen over which strain or change of length is determined.

(m) Elongation—The increase in the gage length in tension of the specimen within the gage length, usually expressed as a percentage of the original gage length.

Note. In reporting values of elongation, the gage length shall be given also.

(n) Reduction of Area—The difference between the original cross-sectional area of the tensile specimen and the area of its smallest cross section, usually expressed as a percentage of the original cross-sectional area.

Note. In reporting values of reduction of area, the original area or dimensions of the cross section shall be given also.

(o) Indentation Hardness—A dimensionless number related to the size of the impression made by an indenter of specific size and shape under a known load.

Note. The term "Indentation Hardness" has no quantitative meaning except in terms of a particular test in which the size and shape of the indenter, the indenting load, and other conditions of the test are specified.

(1) Brinell Hardness Number—A value related to the size of the permanent impression made by a ball indenter of specified size, usually 10 mm in diameter, pressed into the surface of the material under a specified load. The surface area of the impression is determined from the average measured diameter of the rim of the impression and from the ball diameter. The Brinell hardness number is the load on the ball divided by this area:

$$BHN = \frac{P}{\frac{\pi D}{2}\left(D - \sqrt{D^2 - d^2}\right)}$$

where:

P applied load in kilograms,

D diameter of the ball in millimeters, and

d diameter of the impression in millimeters.

In reporting Brinell hardness number the test load is stated.

(2) Rockwell Hardness Number—A value derived from the increase in depth of impression as the load on the indenter is increased from a fixed minimum value to a higher value and then returned to the minimum value. Indenters for the Rockwell test include steel balls of several specified diameters and a diamond cone penetrator having an included angle of 120 deg with a spherical tip having a radius of 0.2 mm. Rockwell hardness numbers always are quoted with a prefix representing the Rockwell scale corresponding to a given combination of load and indenter.

(3) Diamond Pyramid Hardness Number—A value obtained by dividing the load in kilograms applied to a square-based pyramidal diamond indenter having included face angles of 136 deg by the surface area of the impression in square millimeters calculated from the measured diagonal of the impression. The Diamond pyramid hardness number is calculated from the following formula:

$$DPH = \frac{1.8544\,P}{d^2}$$

where:

P applied load in klograms, and

d diagonal of the impression in millimeters.

In reporting Diamond pyramid hardness the test load is stated.

Additional copies of this specification may be obtained from the American Society for Testing Materials, 1916 Race St., Philadelphia 3, for a nominal sum.

It's easy to fit
core formulations
to casting conditions with
FOUNDREZ 7600

Using RCI's liquid, water-soluble, thermosetting, urea-formaldehyde resin — FOUNDREZ 7600 — as a sand binder, you can easily develop the core mix that's best and most economical for your casting metal, oven capacity and production rate.

FOUNDREZ 7600 is flexible. It permits variation of such properties as green strength, collapsibility, permeability and hardness in a wide range of core formulations for copper, brass, bronze, aluminum, magnesium, gray iron, cast iron and steel alloy castings. Moreover, this stable resin speeds baking, an advantage you can use either for faster production or fuel savings.

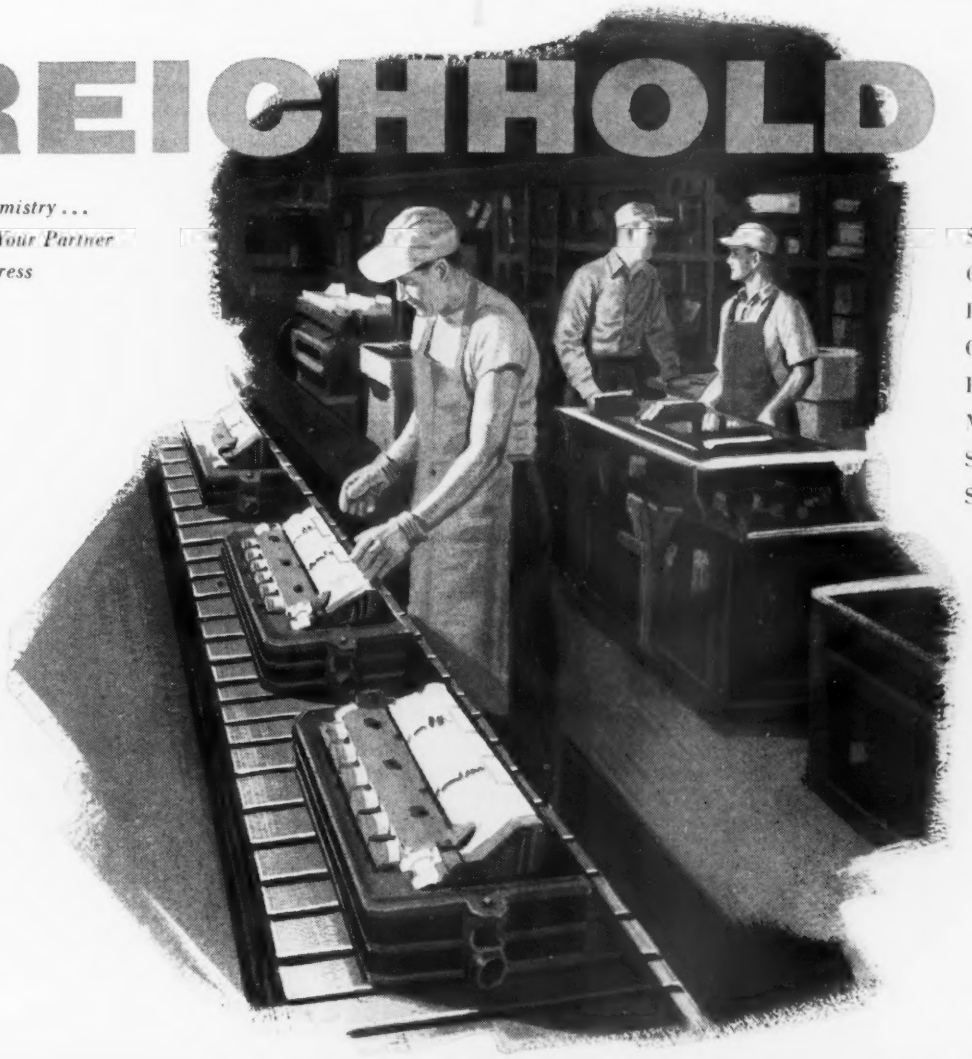
For full data at no obligation, write for Technical Bulletin F-2. RCI's Foundry Technical Service is available to help create the mix most suited to your purpose.

REICHHOLD CHEMICALS, INC. 525 NORTH BROADWAY, WHITE PLAINS, N. Y.

REICHHOLD

RCI

Creative Chemistry . . .
Your Partner
in Progress



Synthetic Resins
Chemical Colors
Phenol
Glycerine
Phthalic Anhydride
Maleic Anhydride
Sodium Sulfate
Sodium Sulfite

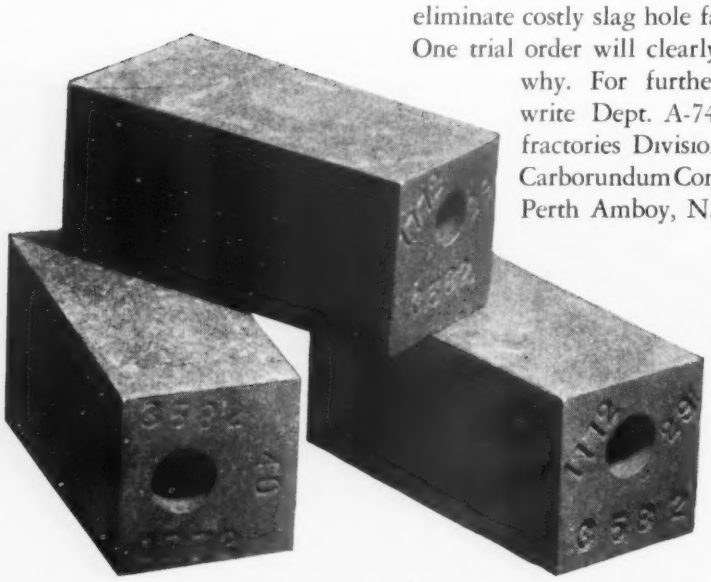
Use slag-hole blocks by

CARBORUNDUM

TRADE MARK

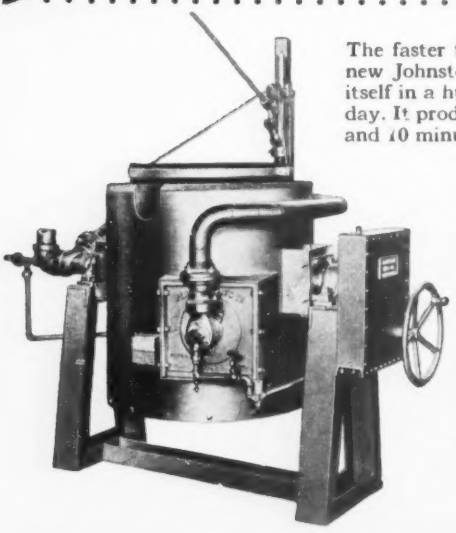
for uninterrupted runs

Operators of continuous pour cupolas report these durable blocks constitute the best current way to eliminate costly slag hole failures. One trial order will clearly show why. For further data write Dept. A-74, Refractories Division, The Carborundum Company, Perth Amboy, N. J.



"Carborundum" is a registered trademark which indicates manufacture by The Carborundum Company.

NEW FURNACE— Melts 1200 Lbs. of Brass IN 1 Hour, 10 Minutes!



The faster the furnace—the lower your cost. The new Johnston No. 400 Crucible Furnace pays for itself in a hurry by hustling more heats into every day. It produces 1200 lbs. of molten brass in 1 hour and 10 minutes on successive heats, gas fired (may also be oil fired as is model shown). Johnston burners, blowers and experienced engineering combine to produce unusual speed with economically low fuel consumption.

A new enclosed tilting mechanism makes tilting easier than ever before and it may be electrically driven.

Crucible life and lining life are extremely good. Trunions are adjustable for best balance and are supported on large pillow block bearings. A simple, convenient cover lifting mechanism is operated from the front of the furnace.

WRITE FOR CATALOG 223F

OVER THIRTY YEARS EXPERIENCE IN THE DESIGN AND MANUFACTURE OF INDUSTRIAL HEATING EQUIPMENT

THE JOHNSTON LINE — SAFETY — DEPENDABILITY

JOHNSTON MANUFACTURING CO.
2825 EAST HENNEPIN AVE.
MINNEAPOLIS 13, MINN.

ENGINEERS & MANUFACTURERS OF INDUSTRIAL HEATING EQUIPMENT

Casting 280-mm Shells

(*Continued from page* 99)

are set on the floor to cool. When cool enough to handle, the cores are removed from plates and driers and placed on wooden shelves.

Assembly operations are performed with care to achieve the desired accuracy in the finished core. First, two core halves are rubbed together for a snug fit and the outside diameter of the assembly checked with a ring gage. Halves then are pasted together, and three aluminum holder rings, one near the center and one near each end, are placed on the assembly to hold the halves together. The cores are laid on another battery of wooden shelves to air dry for 24 hr.

The holding rings then are removed and two thicker aluminum test rings are placed on the core a short distance in from each end. The core is set on a testing machine and revolved through friction contact of the rings with powered rolls on the machine. Contact gages at four positions along the length of the core actuate dial indicators to show concentric variations. Acceptable tolerance is ±0.025-in.

Cores Are Touched Up

Upon removal from the testing machine, cores are touched up with wash before being placed on a roller conveyor for pushing through a propane-fired horizontal oven for drying at 200-250° F. This is a two-compartment oven, the cores being pushed through both compartments for a total drying time of 15 minutes. As they leave the oven the cores are placed on holder-type wooden racks, lined with soft rubber at those points which contact the core, for transportation to the foundry by lift truck.

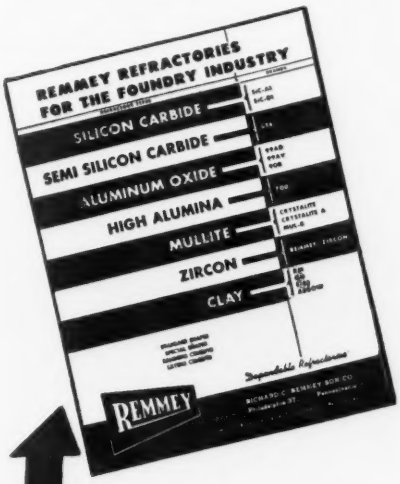
Mold sections are assembled on a square steel plate which rests on lengths of steel rail. Bottom mold section is made with two holes extending from two edges through the center opening into which the neck of the barrel core fits. When the barrel core is placed in the mold after the first five body cores have been assembled, a long drill is inserted in the holes of the base core print and holes drilled into the barrel core. Steel rods, ⅝-in. in diam then are fitted into the holes to hold the barrel core in place, preventing it from turning, wobbling or floating.

Eight more body cores are placed in position and the assembly clamped with dogs which are tightened down against the stack by nuts on threaded steel rods hooked to the steel base plate at the four corners. The semicircular runner and the two ingates, placed opposite each other on the

Foundry Refractory

COSTS CAN BE CUT!

. . . Know the *right* refractory for the job!



Send for the new, complete bulletin on REMMEY Foundry Refractories—

. . . an informative, 2 color bulletin covering the entire line of REMMEY Refractories for the Foundry Industry. Silicon Carbide, Mullite, Aluminum Oxide, Ramming Mixes, etc.

•

A request on your company letterhead will bring it to *you!*

Dependable Refractories

REMMEY

RICHARD C. REMMEY SON CO.
Philadelphia 37, Pennsylvania

Manufacturers of Silicon Carbide, Mullite, Aluminum Oxide, Zircon and Clay Refractories

periphery of the mold cavity, are located between the fifth and sixth cores from the bottom of the stack. These sections are made with the special sand mix shown in Table I. Cylindrical risers above each ingate extend from the fifth to the tenth body core with a carbon rod in number ten to keep the feeders open. The pouring sprue naturally extends up through the top section, which is number 18.

The clamped stack of 13 sections is moved to the pouring area by a platform lift truck, which fits under the bottom plate between the rail sections. Here the mold cavity and barrel core location are gaged with an aluminum fixture by inspectors before the five mold sections are clamped in place. After the assembly is completed, a piece of ¼-in. plate steel 8 x 48 in. is placed on each of the four sides of the mold and banded in place with steel tape to give additional support to the mold.

Two Furnaces Furnish Metal

Two basic-lined electric furnaces of 16 tons capacity are used to furnish metal for the molds. Charges for the 6-hr heats consist of 16,500 lb sprue, 13,500 lb low phosporus plate steel scrap and 2000 lb of 0.40 C steel sprue scrap. Charges are made up with an electro magnet suspended from a bridge crane which traverses the metal storage area. Components are dropped into a weigh bucket, the operator watching a floor level scale dial through a periscope. The weighed load is discharged through the bottom of the weigh bucket through a short chute to the cylindrically-shaped charge bucket. The bottom of this bucket consists of six pie-shaped segments hinged around the bottom edge of the bucket and fastened together at the center by a catch.

The charge bucket is lifted by crane and lowered into the furnace. Bottom of the bucket is opened when a steel bar extending downward from the catch touches the furnace bottom.

Metal is tapped at 3000-3010° F, the entire heat being taken by two 8½-ton bottom pour ladles. One keel block test bar is poured from each ladle. Tests must show an elongation of 12 per cent and minimum yield strength of 85,000 lb. Brinell tests made on one in every eleven of the shell castings show a value of 241 to 255 after heat treatment. Metal analyses are made on a direct reading spectrometer from a sample of metal from each ladle and on two samples taken from the furnace prior to tapping. Approximate metal content is: 0.49 C, 0.85 Mn, 0.40 Si, 0.035 max Su, 0.035 max P,

7 things to remember about

BLASTRITE SHOT AND GRIT

QUALITY
EFFICIENCY
ECONOMY
LONG WEAR
CAREFUL SCREENING
PROPER ALLOYING
LABORATORY CONTROL

AVAILABLE IN ALL SIZES

Ask for our new catalog No. AB-53

ABRASIVE SHOT & GRIT CO., INC.
SPRINGVILLE, N. Y.
Telephone Springville 1

1.00 Cr and 0.15 V.

Metal is poured at 2870° F, and pouring ladles are moved by bridge crane to the molds. Since the completed stacks are over 6 ft high, a catwalk is constructed along the line of molds so that workmen, standing on it, can control pouring operations. When the metal has solidified, the poured molds are lifted by bridge crane and laid on their sides on a car conveyor which travels through a hooded, ventilated cooling tunnel for 10 hr. Upon emergence from the tunnel the molds are hoisted to a vibrating, hooded shakeout. Sand falls through to an apron conveyor and is transported out of the building and up into a hopper set on steel legs. Periodically a truck is driven under the hopper to receive the sand and haul it away to the dump.

Lugs are cast on the exterior shell casting surface at opposite points to facilitate moving by hoist during subsequent operations. The castings are removed from the shakeout by a monorail crane and set on the floor nearby, where gates and risers and the large head feeder are removed by oxypropane torch. This head is 16 in. long, the same diameter as the largest casting section, and is located at the base of tne shell.

Next step is to hoist the shells and place them open end down on special holding frame suspended from rotating hangers in an air blast cabinet. Interior and exterior of the shells are cleaned simultaneously with steel grit. Cleaning of the casting cavity is accomplished by a tube which extends through the shell opening and raises up and down pneumatically, spraying grit against the cavity walls.

Upon removal from the blast frames by crane hoist, individual shells are laid on their sides on waist-high, wheeled metal carts and rolled into hooded, three-sided cabinets and the bottom of the shell cavity ground with air-driven cone-shaped wheels at the end of a 7-ft. long handle manipulated by a worker.

Fins Are Ground Off

Following this internal grinding, the carts are wheeled from the cabinets and the shells transferred by crane hoist to a metal cradle about 12-in. high. Fins are removed from the outside surface by swing grinders.

First step in a series of heat treating operations is to place the shells by crane hoist into four pit-type electric normalizing furnaces each of which holds five shells. Furnace temperature is brought to 1775° F and held there for 8 hr. At the end of that time, the shells immediately are hoisted from these, air cooled and then transferred to a second group of furnaces and held at 1690° F for a little over 6 hr.

When that cycle is completed, the shells are oil quenched on an individual basis in a five-compartement tank. Shells are set in furnaces and quench tank open end up. The tanks are empty when the shells are set in place. A pipe is lowered manually into the shell cavity and the oil turned on. As it surges out of the cavity top it strikes a metal deflector plate mounted on the pipe slightly above the casting and is deflected into the tank compartment around the shell. Quenching is complete in 10-15 minutes and the shell is hoisted to an air cylinder-operated tipping frame for emptying oil from the cavity. Shells then are set in pit-type draw furnaces for a minimum of 7 hr at 1290° F.

From the draw furnaces the shells are stacked on the floor to cool before being placed in the blast cabinet for removal of scale formed during heat treating and quenching operations. From the blast cabinet the castings again are placed in cradle

Need core plates that SPEED PRODUCTION?

. . . then use TRANSITE CORE PLATES that are light-weight and easy to handle

You'll find two important reasons why Transite* Core Plates mean faster production: First, core makers can handle more plates with fewer trips. Second, Transite Core Plates are easier to clean . . . core wash, sand, etc., do not adhere to them as readily as to other core plate materials.

Here are more *reasons why you can profit by using Transite Core Plates:*

They give long service—Made of tough, fibrous asbestos and cement, Transite Core Plates resist shock and corrosion—will not crack or break easily—require little, if any servicing. *Performance records of 8, 10 and 12 years are not unusual.*

They maintain accuracy — Transite Core Plates stay smooth through long, hard service. Foundrymen who have used them for years report minimum warpage.

For cores of large mass and small surface area, perforated Transite Core Plates are also available to eliminate green cores and reduce baking time. For full details write Johns-Manville, Box 60, New York 16, N. Y.

JM PRODUCTS

*Reg. U. S. Pat. Off.

Johns-Manville TRANSITE CORE PLATES

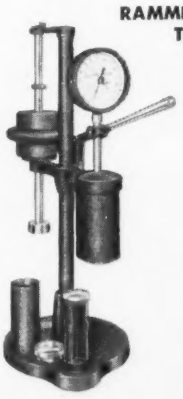
Made of Asbestos

THE Short Cut TO LOW Scrap Losses

When consideration is given to the number of casting defects directly traceable to faulty sand practice, it becomes apparent that proper sand control is the short cut to low scrap losses.

The Gordon-Campbell sand testing units offer the latest improvements for checking these critical properties of sand mixtures: clay content, permeability, bond strength, moisture, core hardness, and core strength. The tests are quick, and no calculations are required. They offer the simplest approach to sand control.

Write for full particulars on Gordon-Campbell sand control units. Savings in scrap losses will pay for the program.



RAMMER-COMPRESSION TESTER—This simple unit combines ramming of specimens for permeability tests and making bond strength tests. Strength values are read on large dial.

PERMTESTER Permeability values for molding and core sand mixtures are shown on dial in a few minutes.

All Gordon-Campbell sand testing units are designed to conform with the recommendations of the Committee on Foundry Sand Research of the American Foundrymen's Society.

FREE TO ANY FOUNDRY MAN

Write for this booklet. It explains foundry sand control and how to reduce scrap losses.

GORDON SERVICE

CLAUD S. GORDON CO.

Manufacturers & Distributors

Metallurgical Testing Machines • Industrial Furnaces & Ovens • Temperature Control Instruments • Thermocouples & Accessories

Dept. 20 • 3000 South Wallace St., Chicago 16, Ill.
Dept. 20 • 2035 Hamilton Ave., Cleveland 14, Ohio

holders and the lifting lugs and gate stubs are removed with swing grinders.

The shells are inspected visually and moved to the company machine shop by fork truck for finishing before being shipped to government installations for loading with explosive.

Full Color Film Depicts Grinding Wheel Safety

Full color 16-mm film called "Play It Safe" is designed to decrease accidents caused by faulty handling or storage of grinding wheels and to promote safety in general. Produced by Peninsular Grinding Wheel Sales Corp., Detroit, it was viewed by over 2000 foundrymen at the recent AFS convention and exhibit in Cleveland.

The film shows how to avoid the major causes of wheel breakage and to prolong wheel life. One of its high spots depicts a grinding wheel flying apart at high speed after it has been damaged. This scene is filmed first at regular speed and then in slow motion.

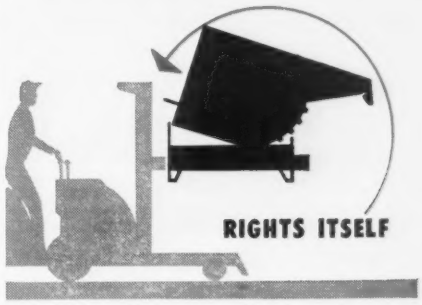
A straight safety film without advertising, the picture is available for showing without obligation wherever grinding wheels are used and to foundry and safety associations. Write Department A, Peninsular Grinding Wheel Sales Corp., Detroit 7.

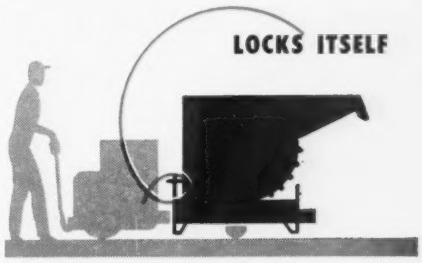
Book Review

Non-Ferrous Foundry Metallurgy, edited by A. J. Murphy, cloth, 497 pages, 6 x 9 in., published by McGraw-Hill Book Co., 330 West 42nd St., New York 36. Price $12.50.

Metallurgy of the alloys and the processes of nonferrous foundry work are treated in this book in a manner which recognizes that progress in this branch of technology has ceased to depend upon the development of operative skills and must be based upon the understanding and application of scientific principles.

The text covers the general principles unifying foundry techniques of all industrial nonferrous metals in relation to metals in the liquid state, to the process of solidification and to the factors influencing properties of casting. Other materials include the part played by gas dissolved in liquid metals, its control and its influence on cast products; factors influencing the grain size of castings, and mechanical properties of castings as complete components compared with the properties in conventional test samples.





Cuts hand unloading costs 50% or more

Figure it out yourself. Compare the cost of this one-man semi-automatic operation with the time and labor involved in hand-unloading. The answer is obvious. Hundreds of leading industries have proved it . . . and are using thousands of Roura Self-Dumping Hoppers for handling wet or dry, hot or cold bulky materials.

Roura builds 'em rugged. They're made of extra heavy gauge metal with sturdy welded joints to stand up under the terrific knocks and bangs of rough handling. Fit any standard fork or platform lift truck. Also available mounted on live skids—casters with malleable or rubber tired wheels. Sizes from ½ to 2 cubic yards.

Let Roura help *you* cut costs.

ROURA *Self-Dumping* **HOPPER**

WANT MORE FACTS?

We'll give you full details . . . without obligation . . . if you'll attach this coupon to your letterhead . . . sign your name . . . and mail to . . .

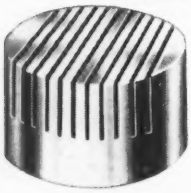
ROURA IRON WORKS, INC.
1417 Woodland Ave., Detroit 11, Michigan

MANUFACTURERS OF PRECISION TOOLS - GAGES - FIXTURES
MACHINED-GROUND PARTS

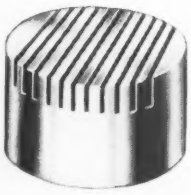
nothing takes the place of PRECISION and PERFORMANCE

CORE BOX VENTS
"A Specific Type for Every Core Box"

Slotted



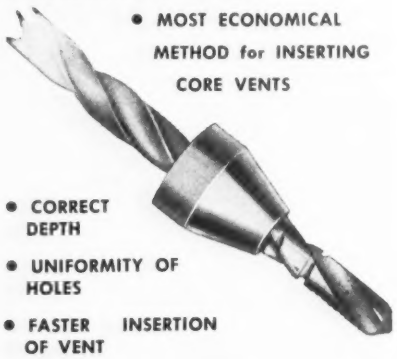
X-TRA DEEP HEAD
.156
Wide Slots
.014



DEEP HEAD
.093
Wide or Narrow Slots
.014 .010

SHALLOW HEAD
.031
Wide or Narrow Slots
.014 .010

INSERTING DRILL



- MOST ECONOMICAL METHOD for INSERTING CORE VENTS
- CORRECT DEPTH
- UNIFORMITY OF HOLES
- FASTER INSERTION OF VENT

VENT CLEANER

- FOR CLEANING SLOTS
- MADE OF TEMPERED STEEL
- EASY TO USE

C.M. SMILLIE & CO.
1124 WOODWARD HGTS., FERNDALE 20, MICH

Human Relations

(*Continued from page* 91)

Of these, the key conferences are those devoted to principles of organization; functions of management; principles of methods improvement; steps in methods improvement; principles of instruction; steps in instruction; foundations of personnel relations; and procedures for effective utilization of manpower. As these titles indicate, the course can be broken down into several sections or "phases"—techniques of management, methods improvement, instruction and human relations; and utilization of manpower and, at the conclusion of the course, an "audit" of the material that has been covered; in terms of its application as well as its nature.

Must Learn To Think

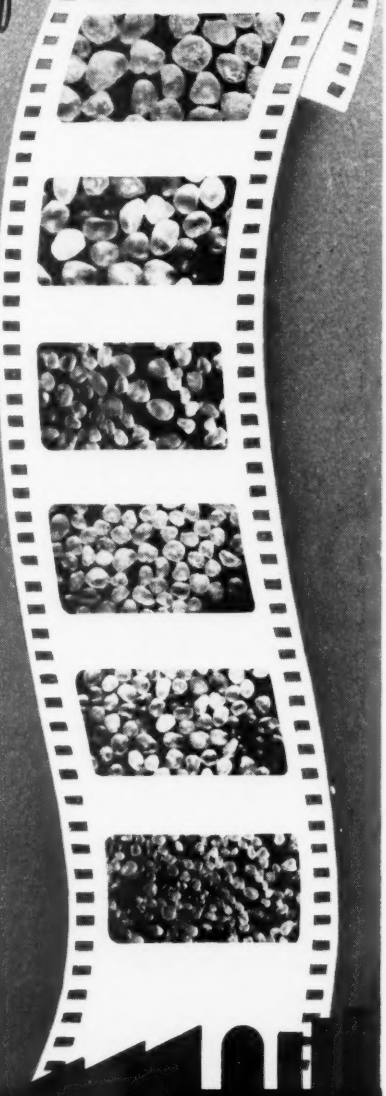
Members of the class are not asked to learn by rote, since the ability to recite something does not necessarily indicate understanding of it. Instead, Mr. Shanley attempts to use what pedagogues call the Socratic method. It demands simply that students think for themselves, that the instructor does not give answers. He asks questions and patiently extracts answers from the students, at one time thus giving them the satisfaction of accomplishment and insuring that they think about the subject at hand. This technique is particularly valuable in this instance because much of the course matter is only common sense or even common knowledge and its application. The problem is to organize it in terms of applications in the plant and to demonstrate its importance to effective operation.

Perhaps one of the more important points concerning this management training program lies in Unitcast's conception of management—that is, who comprises it and should receive the training. Agreeing wholeheartedly with the idea that supervision is only as effective as its first line, the firm includes not only foremen in the course, but assistant foremen as well. In addition to these individuals, all of the company's nearly 120 office workers will have taken the training eventually. This figure includes about 30 women whose participation was not originally planned. They have been added to the list, however, in the light of the success the program has enjoyed with those who already have completed it. For one thing, giving the course to everyone except production workers helps to insure communication and understanding, thereby increasing the

the right SAND for Every casting need

This is Wedron's specialty! No matter what sand you need, from the finest silica flour and fine grades for shell molding to coarser grades for standard casting methods, Wedron can supply you with uniform size, fine, rounded grain sand. For best results in every casting situation, get the right sand for the job...

from WEDRON



MINES AND MILLS IN THE OTTAWA-WEDRON DISTRICT
WEDRON SILICA COMPANY
DEARBORN ST. CHICAGO 3, ILL.

Please send me

FOUNDRY

☐ For 1 Year $5

☐ For 2 Years $8

☐ New subscription

☐ Renewal subscription

NAME: _____ *TITLE:* _____

COMPANY: _____

ADDRESS: _____

(Please indicate whether home or business address.)

CITY: _____ *ZONE:* *STATE:* _____

Does your company operate a foundry? ☐ Yes. ☐ No.

FIRST CLASS
Permit No. 36
(Sec. 34.9 P. L. & R.)
CLEVELAND, OHIO

BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed in the United States

—POSTAGE WILL BE PAID BY—

FOUNDRY
Penton Building
CLEVELAND 13, OHIO

general effectiveness of the training.

At this writing, the latest crop of graduates is a group of 12 executives, policy formers up to and including vice presidents. As one of the latter says, he had to take the course in self-defense, so that he could keep up with the men under him! In addition to this group, 67 others have finished the course of instruction.

At the conclusion of the course, a three-hour graduation dinner party is held at which elaborately engraved, inscribed and mounted diplomas are presented to the participants by Joseph L. Tillman, president of Unitcast. The ceremony includes a social hour, dinner, presentation of diplomas and an address by a distinguished guest.

In order to place this program in its proper perspective, it is necessary to understand some other points about Unitcast's personnel policies, to see how they tie in with the management course, making it part of a continuing program rather than a last-ditch attempt to rectify past mistakes.

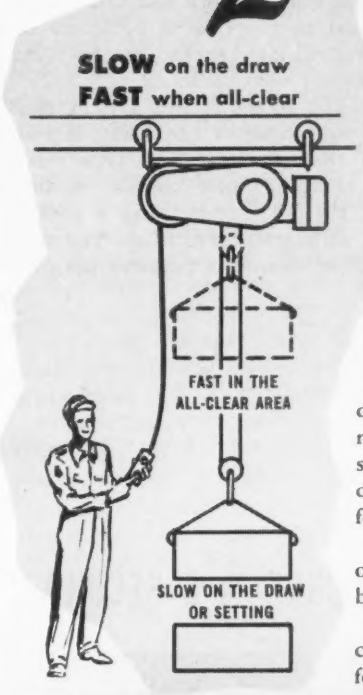
Promotions From Within

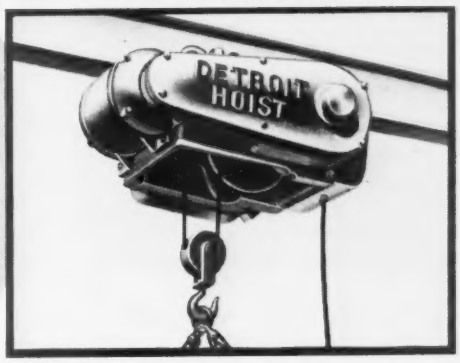
Almost without exception, all foremen and assistant foremen are promoted from within the organization, not brought in from the outside. This policy gives production workers a tangible incentive, demonstrates that ability and achievement are noted and rewarded and at the same time provides supervisors who are familiar with their men, with the work they do and with company procedure.

When such promotions are made, they do not necessarily go to the men with the highest production rates in their respective departments. The ideal foreman is a good leader and an extraordinary producer. Men capable of good production are as sought after and as valued at Unitcast as they are anywhere else. But the company believes that other characteristics and abilities are vital to good supervisors. The prime requirement is that they be able to lead, to understand and to get along well with other persons. In other words, human relations is a fundamental consideration. Promoting the best production man in a department when he can't get production from others is likely to have two results. Not only will the department lose its best producer, but the work of the other men will be likely to suffer, too.

A somewhat similar situation pertains to the employment of administrative employees of all kinds, including those whose work requires college education. The attitude at Unitcast is that the firm is hiring, not just brains, but people who must

2 Speed HOISTS for FOUNDRIES





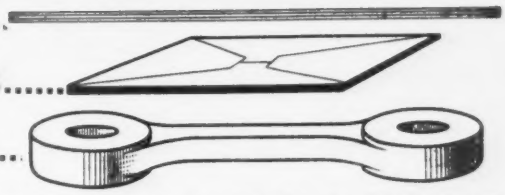
DETROIT, 2 Speed Foundry Hoists have two distinct hoisting and lowering speeds that do not vary with the amount of load—a very slow speed for setting or parting molds or any other delicate operation, and a time-saving, high speed for use in all-clear areas.

The control is simple—one push button operates the two hoisting speeds, a second button operates the lowering speeds.

Detroit, 2 speed hoists available in various capacities, are a boon in foundry work. Ask for additional information on them today.

DETROIT HOIST & MACHINE CO.
Designers & Manufacturers Since 1905
8276 Morrow Street • Detroit 11, Michigan

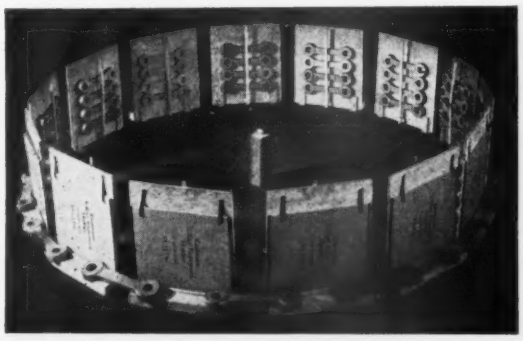
Gamma rays.....
unexposed film.....
steel casting.....



RADIUM RADIOGRAPHY
improves foundry practice and production

Compared with X-ray radiography, radium radiography is new, but its peculiar advantages have been finding increasing favor with steel foundries. The first commercial radiograph with radium was made in 1930—and by 1950 250 steel foundries throughout the country were using radium radiography. The constant activity of radium, the even dispersion of its rays with a minimum of scattering; the portability of the equipment and simplicity of operation all combine to make radium radiography an economical nondestructive method of testing. Write today for case histories and additional information. *Your requirements promptly supplied.*

Illustration shows 60 steel castings being photographed simultaneously. The gamma rays, flying in all directions, go through all the castings at once, making 60 exposures of the 60 castings



RADIUM CHEMICAL CO., INC.

New York: 161 East Forty-second St., Chicago: Marshall Field Annex Bldg., Los Angeles: 3974 Wilshire Blvd.

know other people and be able to get along with them. An introvert with a straight-A average in college may have a place in industry, but he is not likely to perform as well as part of a team as a better rounded individual, such as one with a B average and a personality tending to the extrovert.

In order to assure that employees are fitted for a given job, all applicants for administrative jobs are screened on the basis of aptitude tests. Because they are a big measure of the applicants' fitness, these tests are chosen with great care, and they are analyzed only by the director of industrial relations, Edwin F. Chittenden, who has had much experience in this type of work and takes every precaution to preserve complete objectivity. References receive only secondary consideration.

At the outset of this article, mention was made of the many ingredients that go into Unitcast's recipe for creating good human relations and, thereby, for building a productive, efficient organization. The management course is perhaps the most spectacular, or different, but mention should be made of the others, too.

The company does not maintain a continuing program of on-the-job training, because such training is not required except during periods of expansion, when large numbers of new, often inexperienced, employees are being hired. Currently, for example, no need for on-the-job training exists.

The company does, however, have a continuing program for training in safety. Mr. Chittenden, in fact, is the creator of a safety program called "Let's Pretend," which is nationally employed. Typically, a group of men is asked to perform common, everyday tasks while completely blindfolded and working in a darkened room, pretending that they are blind —because they did not wear safety goggles, for example. They learn from the practical standpoint just how involved even the simple process of lighting a cigarette can be if a man can't see. Every production worker takes the company's course, which is comprised of 12 one-hour sessions, with four sessions a week and 12 to 15 persons in a class. Graduation exercises are held at the close of the course, and graduates become safety monitors in their departments. Eventually, of course, everyone in a department may become a monitor.

Other aspects of the human relations program, not directly related to organized training, include elements designed to make the company a better place to work: An attractive cafeteria, tiled showers, air-conditioned lockers, an employee credit union, company sports teams, paved parking facilities, a house organ, good medical care, a visiting nurse service and a scrap bonus system that enables production workers to earn up to 30 cents an hour extra. Behind them all is the same guiding thought: Happy employees are productive employees.

Another CHROMALOX Production Tip

Core Drying Time Cut from 24 HOURS to 6 SECONDS!

PROBLEM

To speed up the drying of the dip-coat applied to cores for casting automotive parts. At least 24 hours drying time was needed under old method, and 6000 square feet of valuable floor area was used to store the cores while they air dried.

SOLUTION

The foundry installed a compact far-infrared core drying oven made of eleven 3.6 kilowatt all-metal Chromalox Electric Radiant Heaters. A 15-foot conveyor belt, variable in speed from zero to 10 feet-per-minute, moves cores through the oven at rate of 600 to 800 per hour. Cores are thoroughly dry in 6 seconds and ready for assembly.

ADVANTAGES

1—Drying time reduced from 24 hours to 6 seconds! 2—Existing core drying area including oven occupies only 200 square feet against 6000 square feet the old way. 3—Core surfaces are smooth and bubble-free with rejects practically eliminated.

CHROMALOX
Electric Heat for Modern Foundries

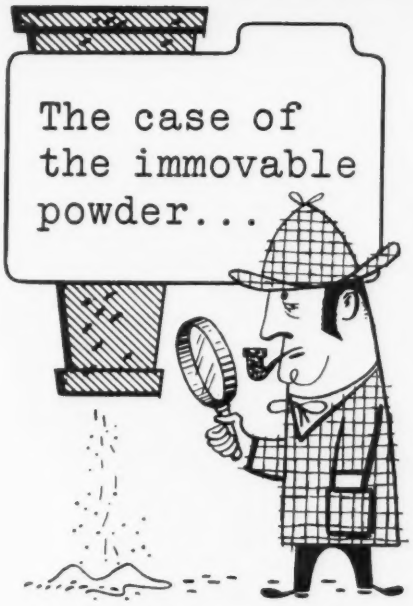
Want to know more about cutting costs with CHROMALOX heat?

EDWIN L. WIEGAND COMPANY SB-32
7596 Thomas Blvd., Pittsburgh 8, Pa.
Send me more details on Chromalox Electric Heat for
☐ Shell molding ☐ Core drying
☐ Skin drying of molds ☐ Comfort heating
Name
Company
Street
City Zone
State

Nickel-Chromium Alloy List Is Revised

Alloy Casting Institute, Mineola, N. Y., has published the first revision since 1951 of the standard designation list covering the most popular grades of nickel-chromium alloys used for heat and corrosion resistant castings.

Based on results of recent institute research programs, the revised chart of chemical composition ranges incorporates designation changes and several additional alloys. It is available from headquarters of the Alloy Casting Institute, 32 Third Ave., Mineola, N. Y.



This case came to a head in a New York cosmetic plant. Keeping dry powder moving through the bins and drums without costly jam-ups was a real problem.

We're happy to say a CLEVELAND vibrator on each bin and drum was the ideal solution. In no time at all production delays became a thing of the past.

Tell us your materials handling problem, or ask for our detailed literature.

AIR *and* ELECTRIC

Bin Stuck Lately?

THE CLEVELAND VIBRATOR COMPANY

2788 Clinton Avenue • Cleveland 13, Ohio

Common Sense in Cores

(*Continued from page* 85)

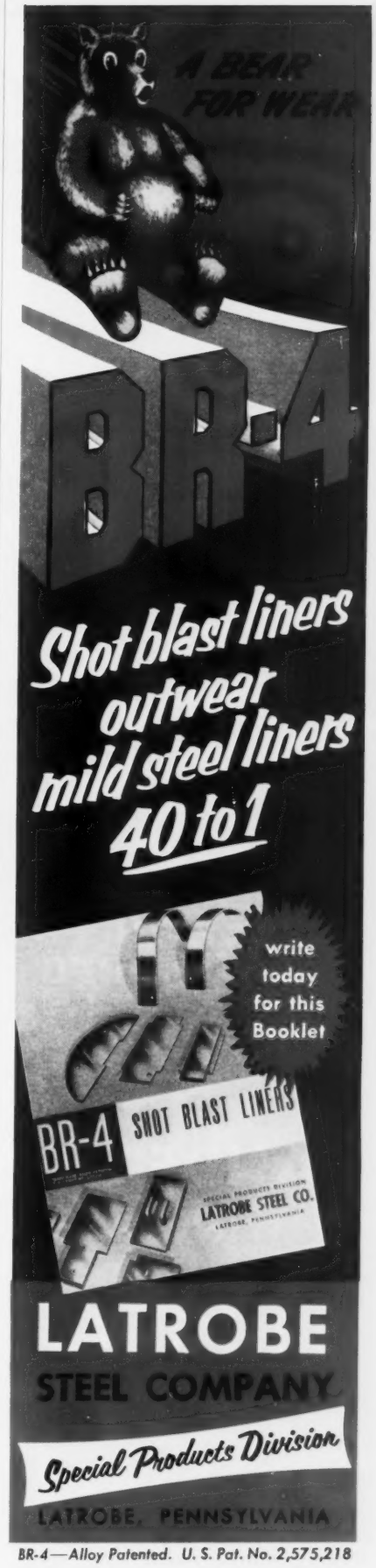
that by no change in amount or type of materials, 60 per cent better green bond and 65 per cent better baked strength can be obtained at the same cost, merely by watching and using the proper sequence of addition of these materials. If the wrong procedure had been used previously and the 167-lb tensile strength had proved adequate for day-to-day operations, an alert coreroom operator conceivably could cut costs and materials drastically merely by using correct procedures. Though the figures shown are for batches made in a muller-type mixer, they remain true for high-speed mullers and paddle-type mixers.

Water Can Be Expensive—Moisture still is the most neglected and misused material in the coreroom. Though practically free in the minds of most foundrymen, its prevalent misuse makes it one of the most expensive ingredients in the shop. Its proper use makes it the greatest single source of practical economy.

Green strength and baked tensile strength of almost any given core mix can be doubled or cut in half merely by varying the moisture content of the mix and leaving all other factors the same. Fig. 2 graphically illustrates the great effect moisture variations have on green strength, baked tensile strength and speed of bake of a standard core sand mix.

An interesting point is that maximum green strength and maximum baked tensile strength are obtained at different moisture levels. This circumstance calls for judgment on the part of the foundryman to determine which is of more importance to him. Generally speaking—and this is only a rule-of-thumb which must be modified to fit the individual case—optimum green bond is obtained when the moisture is at a ratio of 2 to 1 with cereal. Optimum baked strength is obtained when the moisture is at a ratio of about 4:1 with cereal. It is the moisture-cereal relationship which is important. The water combines with the cereal to form a paste. If no cereal is present in the mix, these figures are invalid.

It also is interesting to note that, as could be expected, the more moisture is present, the slower will be the baking of the cores. This is true since moisture must be evaporated from the core before the oil and cereal can harden and become an effective bond. The temperature



BR-4—Alloy Patented. U. S. Pat. No. 2,575,218

Erie BUCKETS ARE A *Specialty* — NOT A SIDELINE

Right from the start we thought enough about buckets to make them our specialty. That was 34 years ago. They're still our bread and butter.

Today, thousands of Erie units all over the world are turning in top performance. That's because they were built with a complete understanding of what they had to do.

Why not let our engineers review your set-up. There's no obligation. And, based on past experience, we're sure we can offer a helpful suggestion.

Write for BULLETIN 403, Dept. F74.

FORMERLY ERIE STEEL CONSTRUCTION COMPANY

ERIE STRAYER Co.

SAME PEOPLE • SAME PRODUCTS • JUST A NEW NAME

874 GEIST ROAD • ERIE, PENNSYLVANIA

Anderson Pattern Inc.

MUSKEGON MICHIGAN

ANDERSON is the Answer to your Pattern Problems

When you are looking for production pattern equipment which is machined all-over and engineered to fit the needs of your foundry.

Write or Phone for Further Information

Established 1931

of the core does not rise above 220° F until the water is evaporated from that particular section of the core. Thus, moisture often does become a factor limiting the speed at which a core can be baked.

In the discussion of moisture, one other interesting feature might be noted. In strainer cores, runner cups and the like where high tensile strength often is required and green bond requirements are low, the strongest possible core can be obtained by using nothing more than dry sand and core oil. The absence of cereal makes moisture unnecessary and even deleterious. In such a case a bone dry sand-and-oil combination will produce about 50 per cent more strength than the same mixture when so little as 1 per cent is added.

Oven Practice Important—Baking time and temperature comprise the fourth, but by no means the least, important factor in immediate and practical coreroom economy. It is of little value to use the best materials and to measure them and mix them properly and to check moisture closely if they are subjected to adverse baking conditions. Generally speaking, a core sand mixture will bake out at temperatures as low as 300°F. However, it will take a great deal of time and oven capacity. The typical core oil has an optimum baking temperature of about 425°F. This also is true for phenol formaldehyde. Urea formaldehyde bakes best at 325 to 350°F.

In periods of high production and short oven capacity, like the one in which the foundry industry has found itself during the past few years, speed of bake of core mixtures has been desirable. Speed of bake never is economical, however. Fast baking binders are available which will permit the baking of cores in up to 50 per cent less time than normal core oils require, but they are more expensive. Consequently, the only sound reason for their use is to evade the necessity of purchasing more oven equipment during a peak production period. In some cases the possibility of reducing dryer investment also will indicate the reasonableness of using more expensive, fast-baking core binders.

The second common approach to increasing the speed of bake is to increase baking temperature of the oven up to 475 or 500°F. In some cases, where cores are of uniform size and shape, this method can be used successfully, but in most cases it is hazardous and uneconomical.

LITHIUM

. . . the Miracle Element

Only 0.005% Makes A Sounder Nonferrous Casting

Lithium has long been established in metallurgy as a degasifier, deoxidizer, desulfurizer and general purifying agent. As a degasifier of Nickel Bronze, Lithium makes possible a dense, fine-grained metal.

A small slug (2¼ grams) of metallic Lithium added to a charge of molten copper or copper alloy eliminates entrapped oxides and gases. Tensile strength and elongation are increased, porosity decreased, and grain size reduced. Characteristic low density causes the lithium products formed to float to the surface where they are easily removed as slag. By adding Lithium the surer way—in the handier *cartridge* form—you eliminate the "by-guess-and-by-gosh" formulation too common with less satisfactory methods.

Lithium Cartridges will give you an improved, more uniform casting with better electrical conductivity, with less trouble and at less cost. The small amounts required put both the economics and technique of Lithium within your reach. Hermetically sealed in copper tubing with easily removed plastic-sealed ends, four sizes—2.25, 4.50, 9.0 and 108.0 grams—are available.

Investigate Lithium Cartridges. Write for details on actual foundry tests.

. . . trends ahead in industrial applications for **LITHIUM**

LITHIUM CORPORATION OF AMERICA, INC.

General Offices:
Suite B, Rand Tower,
Minneapolis 2, Minn.

Plants:
St. Louis Park, Minn. and Bessemer City, North Carolina

Mines:
Black Hills, South Dakota, Bessemer City, North Carolina, Manitoba and Quebec

Fig. 3 shows the effect of baking a given core sand mix at three temperatures, 350, 425 and 500°F. It will be seen that 350°F is effective but slow. The flattest curve and the highest plateau are offered by 425°F. Thus the greatest margin for error exists when thick and thin sections are baked together in an oven. At 500°F, the peak strength obtained never is equal to that obtained at the lower temperatures, and the peak strength soon is lost, thus offering a very narrow plateau and a low margin for error in baking.

The foregoing shows concretely what can be done, at once, to effect immediate economies in the coreroom. With the same amounts of the same materials, physical properties of cores may be improved by 50 or 60 per cent merely by use of the proper sequence of mixing. Physical properties of cores may be improved by 75 or even 100 per cent, certainly by 30 to 40 per cent in the normal moisture ranges, merely by careful control of moisture in core sand mixes. Economies in measurement are more difficult to chart specifically, but are real and possible. Even the best of materials and care can be negated by improper baking time and temperature. Blows due to underbake and cuts and washes due to erosion caused by overbake are costly in terms of casting scrap.

We must investigate the spectacular new methods of making cavities in castings. However, we owe it to ourselves and to our industry to do first things first. A good start would be to review procedures and to control measurement, mixing, moisture and baking time and temperature in the coreroom.

Aluminum Research Work Described in Booklet

Aluminum Co. of America has published a 54-page booklet, "Research at Alcoa," describing work of the aluminum research laboratories and providing a bibliography of technical articles about aluminum. A brief historical note precedes the first section which outlines the work of Alcoa's 14 research divisions at three locations. In the 40-page bibliographic section are listed more than 1000 books, technical papers and articles prepared by Alcoa research scientists in the last 35 years. Copies may be obtained from Alcoa sales offices or from Aluminum Co. of America, 726 Alcoa Building, Pittsburgh 19.

79E BOND

the new miracle grinding wheel bond

Choose Chicago Mounted Wheels — bonded with 79E Bond — and you'll never buy any other! This tough new grinding wheel bond, exclusive with Chicago Wheel, has taken the industrial world virtually by storm, doing a better grinding, burring and finishing job faster. Greatest selection of sizes and shapes for every application. Best of all, deliveries are good . . . ready when you need them. Try 79E Bond Mounted Wheels.

WRITE today for full information and literature. It's free.

CHICAGO WHEEL & Mfg. Co.

Dept. F • 1101 West Monroe Street
Chicago 7, Illinois

OFFICES IN PRINCIPAL INDUSTRIAL CENTERS

Hot Forging of Castings

(*Concluded from page 89*)

then further reduced in the cogging mill. Several values over 90,000 psi with one value of 118,000 psi can be noted. This high tensile resulted from a total reduction by forging and rolling of 240 per cent.

There is some scatter in the elastic modulus values obtained which appear to range from 20,000,000 to over 30,000,000 psi and all hardness values are well over 300 brinell despite the normalizing treatment from 1900° F given prior to hardness and tensile tests.

It has been clearly demonstrated that mottled irons with massive free cementite can be successfully forged and rolled after soaking at 1900° F and that noteworthy high tensile strength and elastic modulus values result from these hotworking procedures.

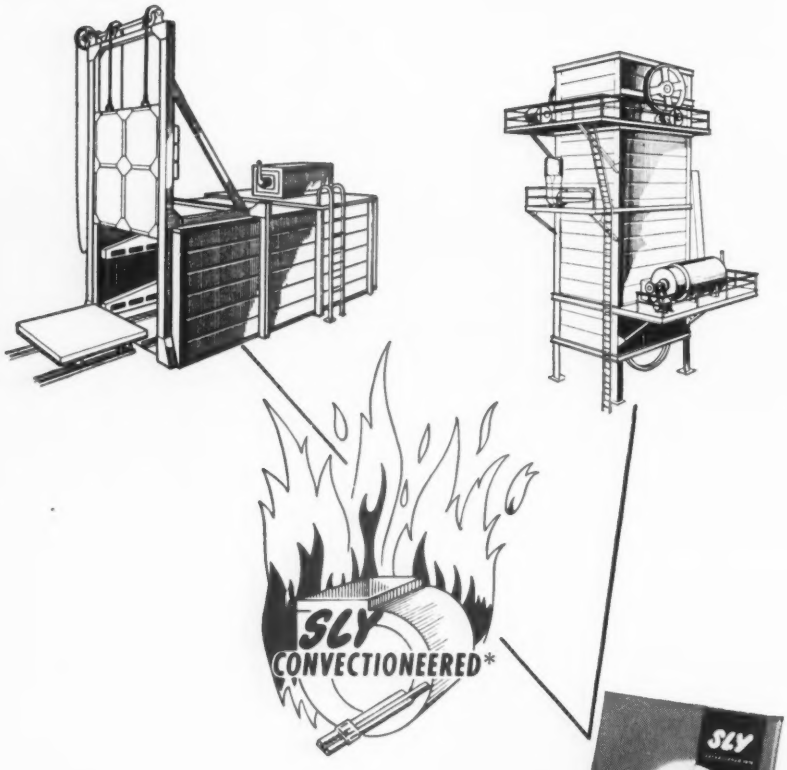
TABLE V—SUMMARY OF TENSILE TESTS ON HOT-WORKED CASTINGS

Material Bar	Reduction, Forged	Reduction, Rolled	Total Reduction	Tensile, PSI	Modulus of Elasticity	Bhn
A	50%	...	50%	92,400	.....	363
A	72%	...	72%	82,400*	.....	363
A	65%	55%	120%	93,000	20,000,000	347
A	65%	175%	240%	118,000	22,500,000	321
B	50%	...	50%	Broke in thread	.....	388
B	65%	155%	220%	97,000	32,000,000	341
B	65%	55%	120%	97,500	25,000,000	382
B	72%	...	72%	86,000	29,000,000	375
C	55%	...	55%	78,000	20,000,000	241

* Break occurred at beginning of radius

SLY INDUSTRIAL • OVENS

SERVING • INDUSTRY • SINCE • 1874



The solutions to your Industrial Oven and process heating problems can be found in this bulletin.

Your inquiries are solicited whether your requirements are for simple ovens or large complicated continuous systems.

For your copy of Bulletin 200 write or call.

THE W. W. SLY MANUFACTURING CO.

4753 TRAIN AVENUE • CLEVELAND 2, OHIO

New York • Chicago • Philadelphia • Syracuse • Detroit • Buffalo
Cincinnati • St. Louis • Minneapolis • Birmingham • Los Angeles • Toronto

Alabama Company Makes Personnel Changes

The board of directors of Alabama By-Products Corp., Birmingham 1, recently made the following personnel promotions: F. C. Koenig Jr., executive vice president; J. Elbert Johnson, vice president and treasurer; Roy H. Norris Jr., vice president, sales; Homer Carder, vice president, by-product operations; Henry J. Hager, vice president, mining operations; William C. Jones, controller, and Clyde H. Porter, assistant secretary.

The other corporate officers were re-elected: Gen. John C. Persons, chairman of the board; P. H. Neal, president; J. A. Shook, secretary, and W. K. Clements, assistant treasurer. W. H. Bailey, formerly manager, coke and coal chemical sales, has been promoted to sales manager.

At the stockholders meeting, all directors presently serving were re-elected: Gen. John C. Persons, A. P. Bush Jr., Hollis Bush, Mrs. Norris Bush, Robert C. Collins, Mrs. Horace Hammond, P. H. Neal, Andrew C. Ramsay, P. G. Shook, M. H. Stearne, and F. G. Koenig Jr.

Students Present TV Show

The Michigan State College Student Chapter of the AFS recently participated in a 10-minute television show featuring a demonstration of how castings are made. The presentation, over the college's TV station, was one of a series of educational programs previewing exhibitions of an engineering exposition on campus. A portable furnace made in the MSC foundry was used to produce a small frying pan. Sand mold was prepared and the molten aluminum poured by two students, while a third acted as narrator for the project.

Publish Volume Covering Depreciation Policy

Results on an extensive research study of depreciation policy by the Machinery & Allied Products Institute have been published by the institute in book form, under the title *Realistic Depreciation Policy*. The new volume analyzes depreciation both as treated for tax purposes and from the standpoint of internal management policy.

The book's analysis of the true pattern of capital consumption and the proper allocation of this cost of production over asset life provides a foundation for informed and intelligent decisions on many matters of management policy affected by depreciation allowances. It also presents a sound basis for management review of depreciation accounting methods. Copies are available at $6 each from the institute, 120 South LaSalle St., Chicago 3.

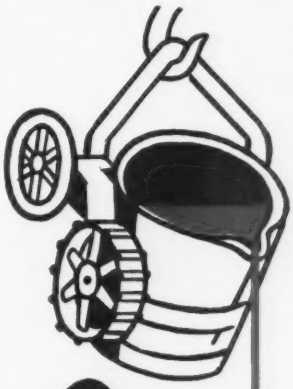
Titanium Alloy Analysis Service Offered

Experience and knowledge gained from nearly four years of work under research and development contracts from the Ordnance Corps, U. S. Army, in finding satisfactory methods for chemical analysis of titanium metals and alloys, will be made available through a new titanium analysis section established by Sam Tour & Co., 44 Trinity Pl., New York 6. The section now is able to handle requests for routine and control analyses for various elements in titanium metal and alloys.

Stainless Filler Metals

Thirteen classifications of stainless steel filler metals are listed in the new Tentative Specifications for Corrosion Resisting Chromium and Chromium - Nickel Steel Welding Rods and Bare Electrodes issued jointly by the American Society for Testing Materials and the American Welding Society (ASTM Designation A 371; AWS Designation A 5.9). Included are 18-8, 25-12 and 25-20 chromium-nickel steels as well as the 5, 12 and 16 per cent straight chromium steels. Copies of the specification may be obtained for 25 cents each from American Society for Testing Materials, 1916 Race St., Philadelphia 3, or American Welding Society, 33 West 39th St., New York 18.

HARDY



To have *control* of uniformity and product characteristics, to improve casting finishes, to cut down delays and losses from casting defects—specify Hardy *Controlled* Foundry Sands. These are the finest foundry sands available. They are the products of continual laboratory testing and research, long experience, and the skills of informed sand technicians. Write or call us for the assistance of a Hardy foundry engineer to help you with any molding or core problem.

Controlled
FOUNDRY
SANDS

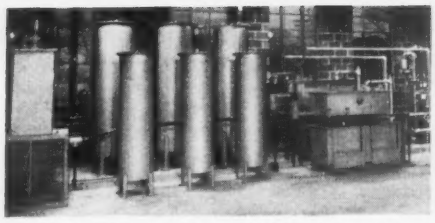
The Hardy Sand Company produces Natural Bonded Sand, Washed Silica Sand, Bank Sands, and are distributors for Mold-Rite, Big-Horn Bentonite, and Refract-O-Mold Spray.

REPRESENTATIVES
WISCONSIN, MINNESOTA, WESTERN MICHIGAN
—Carpenter Brothers, Inc., Milwaukee
CHICAGO—Goebig Mineral Supply Company
CALIFORNIA—Grant & Company, Los Angeles
WESTERN CANADA—Shananan's, Ltd., Vancouver, B. C.

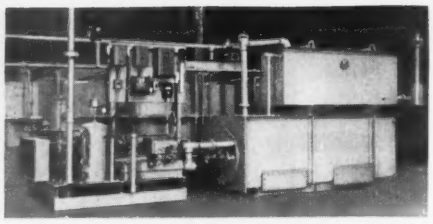
All other states handled direct from Evansville, Indiana

Producing controlled foundry sands for almost fifty years.

HARDY
SAND COMPANY
POST OFFICE BOX 476 EVANSVILLE 3, INDIANA



An EF installation consisting of a 1500 and a 3000 cfh exothermic horizontal water cooled type special atmosphere unit, each with desulphurizing towers and refrigerators for bright annealing steel and copper, and clean annealing brass.



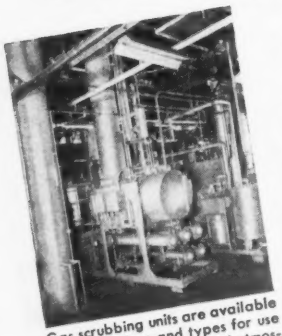
An EF kerosene exothermic gas generator. These are also built in several sizes and types for producing special atmospheres for use in bright annealing copper and steel products in areas where fuel gases are not available.

EF

SPECIAL ATMOSPHERE EQUIPMENT

For any Heat Treating Process . . . any Capacity

Long Experience = High Efficiency + Low Maintenance



Gas scrubbing units are available in several sizes and types for use with any type of EF special atmosphere generating equipment where it may be necessary to remove CO_2 or H_2S.

● As pioneers in the development and use of equipment for producing low cost special atmospheres, we are in position to furnish a wide range of reliable, thoroughly tested special atmosphere units, including endothermic and exothermic gas generators, ammonia dissociators, refrigerators, dryers, desulphurizers, gas scrubbing units and other special atmosphere equipment—equipment with a reputation for high efficiency,—and low maintenance and operating costs.

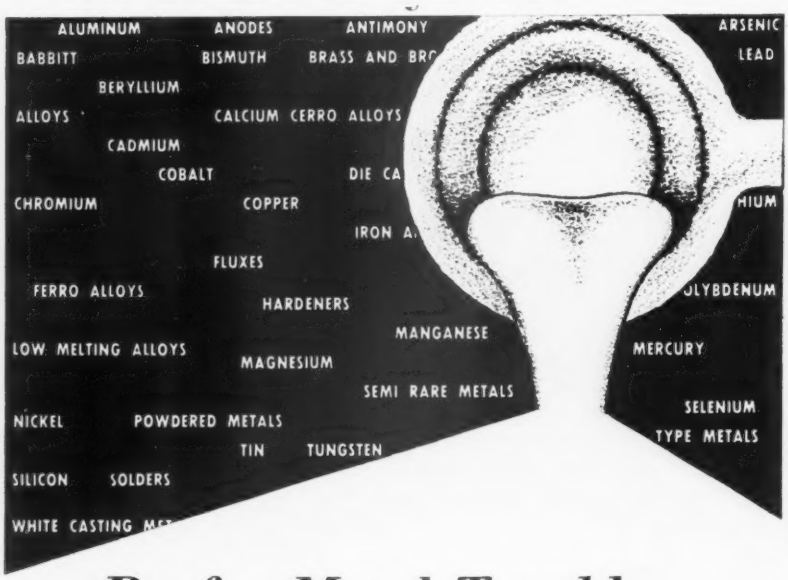
Submit your furnace or special atmosphere problems to experienced engineers — *IT PAYS*

EF Ammonia Dissociators are built in many sizes and types for producing highly reducing atmospheres as required for bright annealing stainless; and other annealing and normalizing processes and preventing decarburization.

THE ELECTRIC FURNACE CO.

WILSON ST. at PENNA. R.R. *Salem - Ohio*

GAS FIRED, OIL FIRED AND ELECTRIC FURNACES FOR ANY PROCESS, PRODUCT OR PRODUCTION



Rx for Metal Troubles—

"BETTER BUY BELMONT"

"Putting METTLE into METALS since 1896"

Belmont

SMELTING & REFINING WORKS, INC.

302 BELMONT AVENUE, BROOKLYN 7 ,N. Y., Dickens 2-4900

all metals • all alloys • all forms

Aluminum Test Bars

(*Continued from page* 105)

lining. It then is removed from the furnace and poured.

The merit of the latter system is that the probability of picking up gas from the products of combustion will be minimized. If the metal is allowed to go too high in temperature in any type of melting the possibility of picking up hydrogen increases rapidly. If this gas is retained and is rejected in the test bars as pinhole porosity, the properties will be affected adversely.

It usually is not necessary to give any special treatment to aluminum that has been melted properly. The use of fluxes is somewhat controversial, but it is believed that in general they are not required on aluminum that has been melted from clean metal in a proper manner. If it is found necessary to introduce a flux beneath the surface of the aluminum with any stirring or agitation, it is well afterward to allow a standing period—at least ten minutes in most cases—for the metal, dross and flux to separate. The most common use for flux is merely as an aid in removing any dross which may be present on the surface of the metal so that efficient removal of the dross is possible, leaving a clean melt surface.

Pouring Practice — The examination of large numbers of defective castings and test bars has led to the conclusion that the majority of defects were produced as the metal poured down the sprue. The pouring operation itself is probably the most widely neglected phase of aluminum foundry practice. Foundrymen in general are concerned about almost every operation except how the metal is poured into the sprue. Poor pouring technique can cause gassing of the metal and the creation and trapping of oxides in the metal stream, all of which contribute directly to poor metal quality, which will result in lower properties in castings and test bars.

An example of poor practice is the use of a high, thin stream in a large sprue that is not kept full. When a test bar (or any aluminum casting) is poured, the sprue should be kept full from the initial part of the pouring cycle, and the ladle should be kept as close to the top of the mold as possible. Fig. 16 illustrates what a good pouring operation should look like, although in some respects the operation could be better than the one shown. In general, it is the best practice to skim the surface of the melt rather than to hold back the dross, as illustrated.

The principal point to emphasize

is that the top of the melt, the surface of the stream and the top of the metal in the sprue are stationary. The liquid aluminum is pouring from the crucible down through a tube of aluminum oxide and into the sprue. There is no aspiration of air, no turbulence in the surface of the metal stream and no mixing with dross. This condition is ideal and should be secured whenever aluminum is poured, whether for test bars or for castings. Of course, it also is desirable to maintain an unbroken stream within the mold so that no turbulence breaks the oxide skin. Each time this skin is broken, the oxide which was on the surface becomes mixed with the metal and finds its way into the casting.

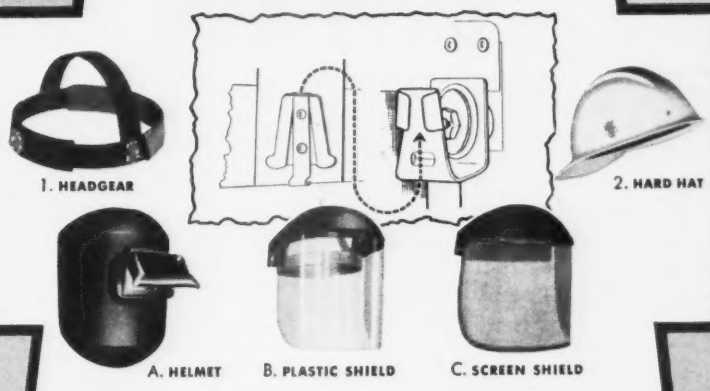
Fig. 17 illustrates the fractures of three test bars which failed because of low elongation. The fairly obvious cause is the oxide inclusions shown. These inclusions caused the elongation to be 1 per cent or less, through no fault of the metal or the heat treatment. They were created by bad pouring practice. These test bars were not indicative of the quality of the melt since the defects were created during the pouring cycle.

Pouring Temperature—The pouring temperature range for test bars of aluminum alloys is relatively uncomplicated. By far the majority of aluminum alloy test bars are poured between 1250 and 1325° F. The preferred range is between 1250 and 1280° F. Since all the test bar data found in the specifications and standard reference tables have been obtained in this temperature range, it is not wise to pour test bars much outside of it. On this point, government specifications also cause some confusion. Navy specifications state that test bars shall be cast from the same melt and under the same conditions as the castings they represent, with no specific mention of pouring temperature. The phrase "under the same conditions" would have to be construed as meaning the same pouring temperature.

Federal specifications, on the other hand, are more positive. They state, "the temperature of the metal while pouring test bars shall not be lower than 20° F below the temperature at which the castings are poured." They also state that if the pouring temperature of the castings is above 1400° F, specific approval must be obtained from the procuring agency regarding the pouring temperature of the test bars and the properties which they shall meet. If all the properties in the specifications have been obtained at a casting temperature of 1250° F, it must be agreed that difficulty will be had in obtaining the same properties with metal poured

CESCO RIGHT... before your Eyes!

NEW Mounting



Assemble Your Own Combinations

Here's a way for you to save money on head, face, and eye protection equipment. Now you don't have to buy duplicate headgears or hats. If you need a helmet (A) and face shield (B), buy them along with only one headgear (1) or hard hat (2).

Items **A, B** and **C** can be used with either items **1** or **2** illustrated above so you can make six different combinations. The old-fashioned way you would buy a helmet and headgear, a shield and headgear, and so on until you had six combinations (twelve items) to do the same thing these five separate pieces will do.

The new CESCO Mounting has an easily adjusted tension spring to compensate for weight differences. Tilting mechanism permits easy raising and lowering. Wedge shaped brackets slide apart or together quickly, and lock securely.

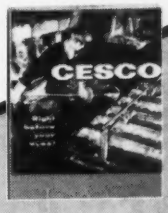
Save buying extra parts . . . save money

On your next order specify CESCO interchangeable helmets and face shields.

They're—"*Right...before your Eyes.*"

Send TODAY

for CESCO literature and the name of your CESCO safety equipment distributor



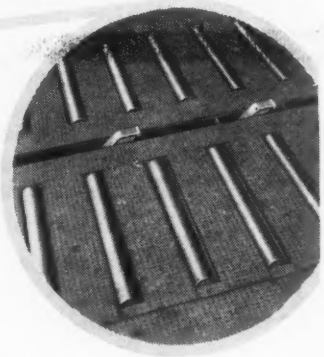
CHICAGO EYE SHIELD COMPANY • 2324 Warren Blvd. • Chicago 12, Illinois

CESCO FOR SAFETY

OFFICES IN: Atlanta, Birmingham, Boston, Buffalo, Cincinnati, Cleveland, Columbus, Dallas, Detroit, East Orange, Houston, Indianapolis, Kansas City, Knoxville, Little Rock, Los Angeles, Louisville, Mexico City D.F., Milwaukee, Montreal, Peoria, Philadelphia, Pittsburgh, Salt Lake City, San Francisco, Spokane, St. Louis, St. Paul, Toledo, Tulsa, Wichita

20,000 lb. Molds Now Handled Easily!

with an ALVEY-FERGUSON Engineered Conveying System



IN THIS modern foundry, heavy molds weighing from 15,000 to 20,000 lbs. are handled easily on an Alvey-Ferguson Heavy Duty Roller Conveying System with an air operated reciprocating pusher between the two lines of rollers. (See inset photo)

For handling molds, flasks and sand in *your* foundry a completely co-ordinated Conveying System engineered by Alvey-Ferguson will reduce worker's fatigue, lessen breakage, increase efficiency and production in the same space—and therefore reduce costs . . . An Alvey-Ferguson *Engineered* Conveying System quickly *pays for itself in savings!*

THE ALVEY-FERGUSON CO. OF CINCINNATI

For a discussion of latest efficient handling methods—write today.

104 Disney St. Cincinnati, Ohio

SINCE 1901 . . . FIRST IN PRODUCTS HANDLING EQUIPMENT

at 1400° F. Since it is the purpose of test bars to indicate the melt quality and the heat treatment, they should be poured in a manner that will produce the best soundness. If castings are of such a shape or complexity that it is necessary to pour at 1400° F or higher, the portion of metal that is going into the test bars should be allowed to cool down to at least 1300° F before the test bars are poured.

In the absence of powerful grain refining agents, the grain size of cast aluminum alloys is directly proportional to the pouring temperature; that is, a large grain size will be found at a high pouring temperature and a fine grain size at a low pouring temperature. Large numbers of tests have shown this to be the case even with the same melt. Large grain size therefore generally is indicative of a high pouring temperature, and it usually is found that test bars having large grains also have reduced properties.

In the past, these low properties have been blamed on the large grain size, but the writers do not believe that this contention necessarily is true. The poorer properties are due to the presence of increased shrinkage and gas porosity caused by the high temperature. The large grain size also was caused by the high temperature, but it is merely a concurrent phenomenon, not the cause of the poor properties in the test bar. Certain controlled experiments have shown that test bars of equal soundness have equal properties, regardless of the grain size within a 10-15 fold range.

Heat Treatment — Most castings produced to specifications which require the use of test bars usually are required to be heat treated. Test bars are heat treated with the castings that they represent and are capable of indicating the quality of the heat treatment if their composition is correct, they are clean and they have been poured at the proper temperature with metal of good quality. Test bars should not be placed in the furnace charge with the castings in a careless manner. They should be placed with care so that they are flat and no pressure is placed upon them by other portions of the load.

When aluminum is heated to the solution heat-treat temperature, it is quite soft and is just capable of supporting its own weight. Test bars which are at an angle or which have other castings piled on them are likely to sag or to be deformed, a condition which will affect seriously the proper testing of such bars. Test bars also should be placed at the outside of the load rather than toward the center. This location will

insure that they receive a more rapid quench after the solution heat treatment. Generally speaking, the more rapid the quench the better the properties. With castings it is not necessarily desirable, because of warpage and cracking difficulties, to obtain as rapid a quench as possible.

The prescribed temperature of the heat treatment should be followed precisely. The temperature variation within the furnace should be in a range of plus or minus 5° F if possible. For example, the solution heat treatment temperature for 195-type alloy is 960° F. If this alloy is heated to 975° F, it will begin to melt, and the casting will be distorted. If the temperature should only be 945° F, the heat treatment may be inadequate. The time of solution heat treatment usually is specified and should be observed carefully. The time of artificial aging also is important, but may be adjusted at the discretion of the foundry and/or the heat treater.

Military specifications covering aluminum alloy castings do not specify a particular heat-treatment time. They only state that the material shall be treated properly to produce the mechanical properties specified. It often is found that a particular foundry and heat treater must adjust the aging time to obtain the specified properties to compensate for their own particular practice in the foundry and in the heat-treat furnaces. That which is satisfactory in one foundry may not produce the specified results in another.

Testing Procedures—The testing of test bars to determine mechanical properties is another phase of test bar operations which appears to be simple, but there are details which if improperly conducted can lead to failures or misleading results. If a foundry is fortunate enough to have its own tensile testing machine and to do its own testing, it will experience less trouble since everything is under one roof and one control. If a foundry must send its test bars out to a commercial laboratory, however, there are variations in the techniques used.

The punch marks placed on the tensile section of the test bars to indicate the 2-in. long gage length should be sufficient only for the use of dividers in determining the amount of the elongation. If these punch marks are too deep, failure of the bar may occur through the punch mark, making the elongation measurement difficult or impossible and also causing the indicated elongation to be below what it should have been.

The determination of yield strength also is subject to variations in practice. The Navy, in Military Specifica-

ABC

FOUNDRY COKE

Enjoys More Widespread and Diversified Distribution Than Any Other

ABC Foundry Coke—the product of over 33 years of specialized experience and continuous research—is sold in 32 States and several foreign countries.

It is produced in one of the nation's largest and most modern plants.

Recently expanded coke production capacity—now over 900,000 tons of strictly merchant coke per year—enables ABC to meet the widely varying demands of its customers and assure them a thoroughly dependable source of supply during periods of peak demand.

Unlike most other coke plants, ABC has no blast furnace or other affiliations having first call on its production.

ABC Foundry Coke is available in sizes to meet the exacting requirements of any cupola operation.

Your inquiries invited

ALABAMA BY-PRODUCTS CORPORATION

General Sales Office: First National Building, Birmingham, Ala.

Sales Agents:

GREAT LAKES FOUNDRY SAND COMPANY, Detroit; ST. LOUIS COKE & FOUNDRY SUPPLY COMPANY, St. Louis; THE RANSON AND ORR COMPANY, Cincinnati; KERCHNER, MARSHALL AND COMPANY, Pittsburgh; BALFOUR, GUTHRIE & COMPANY, LTD., San Francisco; ATWILL COKE AND COAL COMPANY, Chicago

FOR THE FIRST TIME . . .

A small-foundry kiln type oven with custom features at this standard model low price . . .

This new MOCO Oven is perfect for baking, heating, drying, and curing. It is specially designed and engineered to include many of the features made famous in MOCO's custom-built ovens.

All these features are included in one amazingly low price:

- Operating Temperatures up to 500° F.
- Large Volume Air Recirculation
- Forced Ventilation
- Uniform Temperatures
- Quality Safety Equipment
- Automatic Temperature Controls

GET ALL THE FACTS TODAY

MICHIGAN OVEN COMPANY DETROIT MICHIGAN MOCO

The model shown has a work chamber 4 ft. wide by 4 ft. deep by 6 ft. high and is gas operated. Other Standard sizes are available. For further information, write for this comprehensive folder today.

MICHIGAN OVEN COMPANY

419 BRAINARD · DETROIT 1, MICHIGAN

tion MIL-A-17129, does not require yield strength determinations; however, Federal Specification QQ-A-601a does specify yield strength on four alloys. The best method for the determination of this property is to plot a stress vs strain curve and to obtain the yield strength therefrom by the 0.2 per cent offset method. Yield strength also can be determined by observing the load at a certain specified extension of the test bar. For this method it is necessary to use an extensometer capable of reading to 0.0001-in. The use of dividers in the extension-under-load method is only approximate and is not to be relied upon for specification purposes.

If the results obtained from the testing of the test bars meet the specified values, then the castings which they represent are accepted, and the test bars are of no further concern. If the values obtained do not meet the specified properties, more test bars must be tested according to the particular specification involved, or the entire lot of castings may be rejected. The problem then is to determine what is the cause of the poor properties obtained on the test bars. This is where experience in the interpretation of the results, together with an examination of the test bars themselves, will pay dividends.

Check Bar For Defects

The first thing that should be done is to examine the broken test bar to establish whether or not mechanical defects in the bar itself contributed to the poor properties. If test bars are sent to a commercial laboratory, it is strongly recommended that the broken bars be returned with the report sheet. It is surprising how few foundries examine the broken bars and, in failing to do so, mistakenly blame the composition or the heat treatment for a failure which was due in fact to a poor test bar. If the test bar is examined and nothing can be found wrong with its external surface or with the fracture—that is, if no porosity, dross or other defect which may have caused premature failure can be seen—only then can the composition or the heat treatment be suspected.

Many times the properties themselves give some indication as to what is wrong with the test bar. If the yield is satisfactory and the tensile and elongation values are low, a mechanical defect in the test bar is indicated. In another case, exceptionally high yield strength and low elongation indicate that the heat treatment was not correct. Generally, the latter situation will exist when the aging time has been too long. If the alloy composition is not correct,

the error is more difficult to detect from the properties alone because the composition and the heat treatment may overshadow each other since either one could cause properties below normal.

AMA Completes Study of Management Education

A research group under direction of the American Management Association recently has completed a 15 month nationwide study on "Management Education for Itself and Its Employees" within American business and industry. The survey was conducted by mail and by study teams in the field. More than 2500 businesses of all types and sizes were studied. The results have been published in four volumes.

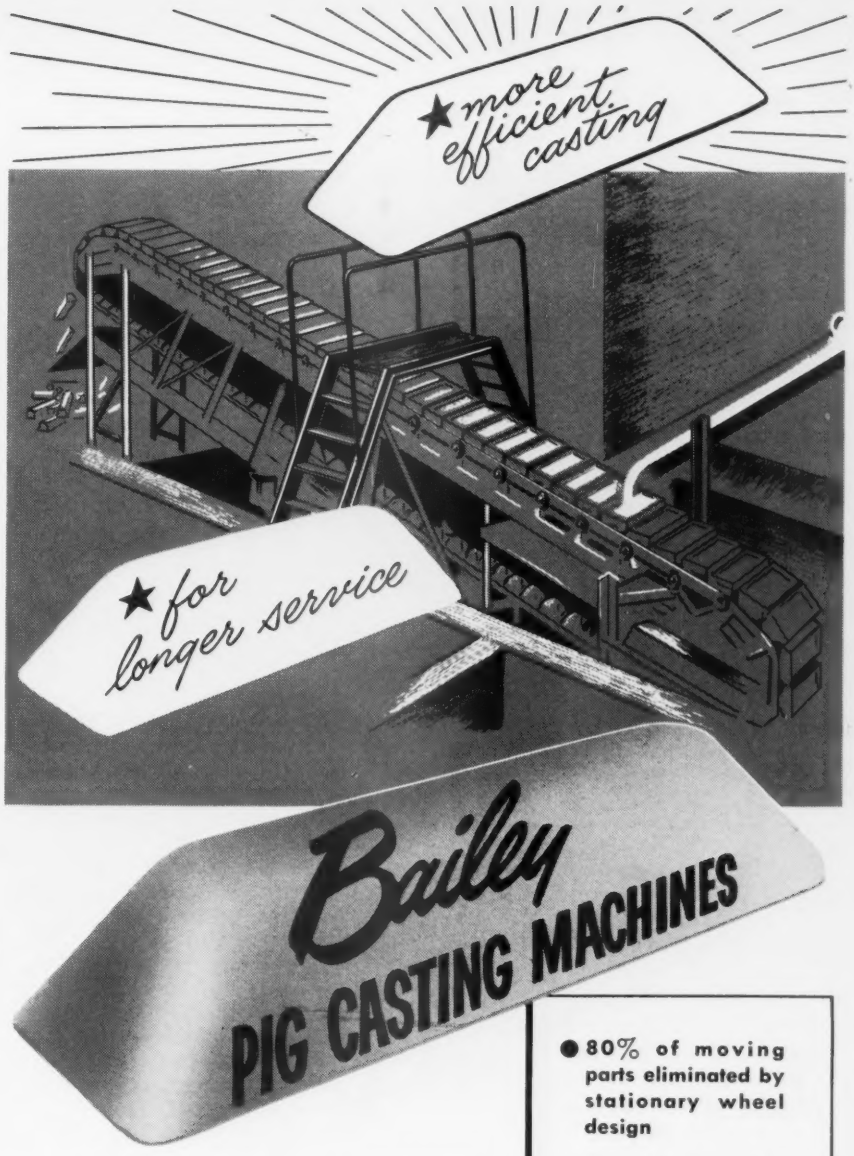
Part I, "Management Education in American Business," traces the management development movement in this country from its beginnings to its current "renaissance," outlines company management development activities to date, discusses the psychological profile of a successful executive and offers suggestions for future recruiting and training of executive personnel.

Part II, "A Survey of Management Development," studies the policies and practices of management development as observed in 2484 companies of every size and type. The occurrence of specific techniques and principles is analyzed to indicate patterns or trends. Programs treated in this manner include: Frequency and age of plans, comprehensiveness, responsibility, methods, topics and subject matter used in training, outside resources and aids, and over-all effectiveness.

Part III, "Case Studies in Management Development," studies the actual methods used by ten representative companies in the development of their executive personnel. Each company report covers its history, organization, policy and practice with regard to executive personnel (including compensation, retirement, and promotion programs).

Part IV, "The Education of Employees," is a detailed description of what management is attempting to teach its employees and how management is setting about to do it.

Copies of the reports are available from American Management Association, 330 West 42nd St., New York 36. Cost per copy of Part I is $1.50, Parts II and IV, $1.25 each and Part III $2.50.

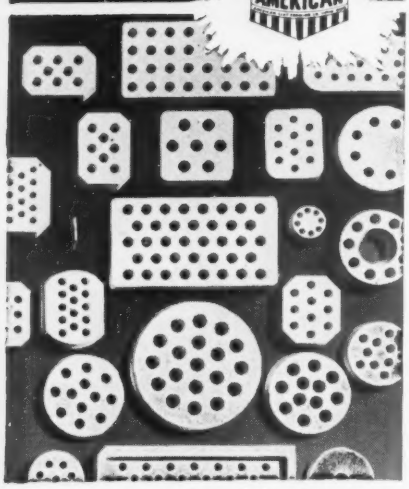


- 80% of moving parts eliminated by stationary wheel design
- Capacities from 3 to 50 tons per hour
- Lengths: 15 to 125 feet, in multiples of 5 feet

Foundries and small capacity metal producing operations particularly benefit from the simplified design of these machines. The unique stationary wheels are the basic reason why the machines assure much more efficient casting and far longer service. In this design the idler wheels are mounted on the frame, rather than on the moulds, thus keeping them as far as possible from the hot metal. Completely self-contained, the unit includes the machine proper, a motor gear unit, and a variable speed reducer and drive.

WILLIAM M. Bailey COMPANY
ENGINEERS
LEADERSHIP THROUGH QUALITY
1221 BANKSVILLE ROAD PITTSBURGH 16, PA.

Fewer Rejects with AMERICAN CERAMIC STRAINER CORES



Here are just a few of the American Ceramic Core designs available

Rejected castings cost MONEY! That's why it will PAY you to investigate American Ceramic Strainer Cores for your foundry.

Made of high quality materials to withstand the shock of molten metal — American Cores remain round and uniform during the pouring operation — this assures you of a slag-free casting every time.

American will quote prices on any size or shape Strainer Core. Write today for samples and descriptive literature. There's no obligation, of course.

AMERICAN

THE AMERICAN CLAY FORMING CO.
Tiffin, Ohio—Tyler, Texas
Manufacturers of Specialized Refractories for over 30 Years

TRADE PUBLICATIONS

For more details on these items use reply card—page 214

ALUMINUM BASE ALLOYS: Apex Smelting Co., 2537 West Taylor St., Chicago 12, Ill.—The properties of the company's line of aluminum base alloys for high-strength castings without heat treatment are described in file-folder brochure. Engineering information on the alloy series' mechanical and physical properties with a discussion of its castability and machinability is included.
For More Details Circle No. 121—Page 214

ULTRASONIC TESTING: Sperry Products Inc., Danbury, Conn.—Industrial utilization of ultrasonic waves for nondestructive testing of materials and products, as well as the application of the technique to existing quality control systems is the subject of bulletin 50-105. Company claims their reflectoscope, using these techniques, is capable of revealing defects through 30 ft of metal and pinpointing the location.
For More Details Circle No. 122—Page 214

RATCHET LEVER HOISTS: Coffing Hoist Co., Danville, Ill.—Bulletin SP describes line of ratchet lever hoists, including both roller and coil chain models, with capacities ranging from ¾ to 15 ton. In addition to features, specifications, and special hooks, the bulletin highlights the ratchet-pawl construction that eliminates friction brakes and the quick disassembly feature of coil chain hoists.
For More Details Circle No. 123—Page 214

DOORS: International Steel Co., 1983 Edgar St., Evansville, Ind.—Illustrated catalog shows installations of the company's custom-built doors to meet a variety of industrial needs. Information valuable to engineers, architects and building management executives will be found in the detailed descriptions and designs for turn-over, bi-fold, telescoping, straight slide, swing, crane, pier and vertical lift doors.
For More Details Circle No. 124—Page 214

CONTROL VALVES: A-P Controls Corp., 2450 North 32nd St., Milwaukee 45— Concise descriptions of standard and custom built flow control valves for starting, stopping, mixing, blending, metering, measuring or controlling pressure, level, temperature and expansion in refrigeration, heating, air conditioning or industrial applications are found in catalog labeled "Solve These Flow Control Problems."
For More Details Circle No. 125—Page 214

LIMIT SWITCH: R. B. Denison Mfg. Co., 102 St. Clair Ave., Cleveland 13—Cutaway photographs are used to help describe in detail the electrical, mechanical and maintenance characteristics of a heavy-duty limit switch. The switch is designed for machine tools and features long life, a trigger type mechanism and the bounce characteristics of a light-duty switch combined with the vibration resistance of a heavy-duty switch. Dimensional drawings, ampere ratings and other specifications also are included.
For More Details Circle No. 126—Page 214

FLOOR SURFACE: Flash-Stone Co. Inc., 3723 Pulaski Ave., Philadelphia 44—Flooring process is said to add the strength of iron to heavily-traveled concrete floors subjected to rolled or skidded loads. The process installs a ⅛-in. veneer of iron-chip aggregate over fresh concrete topping. The operation is performed with special heavy-duty equipment to insure maximum compaction and adhesion of concrete and metal.
For More Details Circle No. 127—Page 214

ALLOYS: Alter Co., 1700 Rockingham Rd., Davenport, Iowa—Pocket-size booklet emphasizes the master and special alloys manufactured for use in the nonferrous foundry industry and the iron and steel industries. In addition to analysis of the company's alloys, general information, color scales, melting point, density and weight, and temperature conversion tables are part of the contents.
For More Details Circle No. 128—Page 214

LOW PRESSURE BURNERS: Hauck Mfg. Co., 124-136 Tenth St., Brooklyn 15, N. Y.—Catalog 413 announces a series of low pressure air type burners for either oil or combination oil and gas. Burners are intended for multiple burner furnaces, ovens, or kilns where a group of burners are operated from one point to ratio and control the capacity of air and fuel by varying the pressure.
For More Details Circle No. 129—Page 214

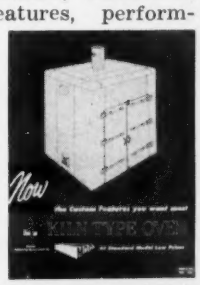
POWER PRESSES: Hydraulic Press Mfg. Co., Mt. Gilead, O.—Bulletin 5401 shows pictorially with concise descriptions the company's wide range of hydraulic power and pressure processing equipment, plus hydraulic components, which include pumps, motors, cylinders, valves, power units and accessories.
For More Details Circle No. 130—Page 214

CORROSION RESISTORS: Carboline Co. Division, Mullins Non-Ferrous Castings Corp., 331 Thornton Ave., St. Louis 19, Mo.—Bulletin 100 is the first attempt, according to the authors, to define the serviceability, cost and life of each material in a

line of corrosion resistant coatings. Corrosive service conditions are placed in broad classifications and the life of the product estimated in each corrosive condition. Limitations of each material are made clear by tabulated data.

For More Details Circle No. 131—Page 214

KILN TYPE OVEN: Michigan Oven Co., 415 Brainard, Detroit 1, Mich. — Special features, performance data, and available sizes of a line of kiln type ovens for baking, heating, drying, and curing is provided in folder. The ovens feature telescoping panels of heavy gage steel for expansion and contraction under heat, and beveled and gasketed relief-type doors with safety latches at top and bottom.



For More Details Circle No. 132—Page 214

MATERIALS HANDLING: Automatic Transportation Co., 149 West 87th St., Chicago 20—Action photographs to illustrate case histories are used in nontechnical guide to point out how properly planned materials handling can reduce production costs. Entitled "The Materials Handling Cost Cutter," the guide is intended to help the general businessman analyze his material handling problems.

For More Details Circle No. 133—Page 214

FIRST AID KITS: E. D. Bullard Co., 275 Eighth St., San Francisco 3—Information and photographs of 16 different types and styles of first-aid kits is included in catalog. One page lists 70 different first-aid packs so that any desired combination can be selected with ease. Catalog also contains a data sheet listing suggested units of exact types most frequently used in specific industries.

For More Details Circle No. 134—Page 214

REFRACTORY RESEARCH: Battelle Memorial Institute, Publications-Public Relations, 505 King Ave., Columbus 1, O.—Folder presents some ideas for research that various observers of refractory technology and markets regard as of potential benefit to producers and users of refractories. A mean thermal conductivity conversion chart is included as part of the presentation.

For More Details Circle No. 135—Page 214

PLANT PROTECTION: William J. Burns International Detective Agency Inc., 101 Park Ave., New York 17—Informative booklet, "It Takes More than Fences," reviews for business executives the most common dangers of security leading to physical losses as well as impairment of employee efficiency.

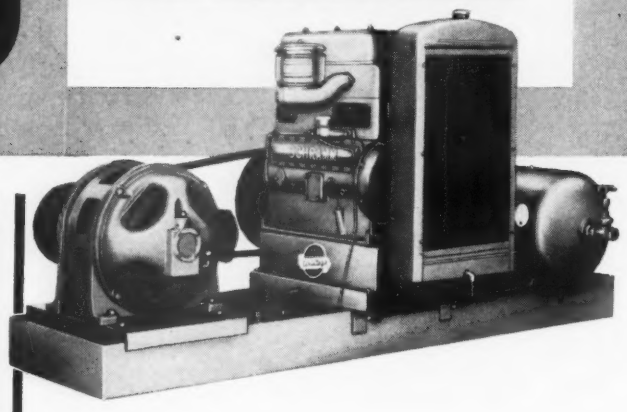
For More Details Circle No. 136—Page 214

HEAVY DUTY EQUIPMENT: Allis Chalmers Mfg. Co., Tractor Division, Milwaukee 1, Wis.—Revised general catalog pictorially describes

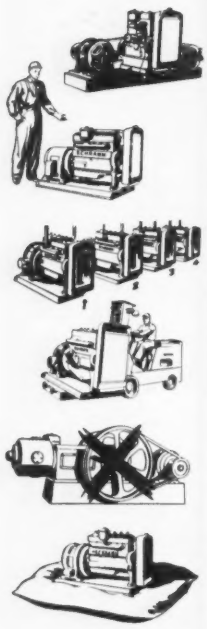
HAUSFELD
METAL MELTING FURNACES
FOR
BRASS—ALUMINUM—MAGNESIUM
AND ALL OTHER NON-FERROUS
METALS AND ALLOYS
GAS OR OIL FUELS

TILTING AND NON-TILTING TYPES
SINGLE AND MULTIPLE BURNERS
AUTOMATIC PROPORTIONING SINGLE VALVE CONTROL ASSURES UNIFORM RESULTS WITH MAXIMUM ECONOMY OF OPERATION.
The Campbell-Hausfeld Co.
300-320 MOORE ST. HARRISON, OHIO

8 reasons why you save $$$$ when you buy a SCHRAMM AIR COMPRESSOR



"V" Belt Drive With Motor, Cooling Unit And Horizontal Air Receiver



COMPLETE PACKAGE Easy to install and capable of furnishing 24 hour continuous service.

COMPACT Occupies only a fraction of the space required by other makes and designs of compressors.

UNIT SYSTEM You can install several Schramm Compressors, as your needs require, in a minimum of space.

EASY TO MOVE When your plant layout changes or you need an air compressor in another building.

ONE COST No expensive foundation necessary. Just install directly on any substantial floor.

VIBRATIONLESS Perfect balance of pistons and connection rods and vertical in-line construction, makes for vibrationless operation.

LOW MAINTENANCE Proper operating speeds . . . less horsepower required by compressor, cam operated mechanical intake valves provide greater volumetric efficiency.

LOW INITIAL COST Built in sizes ranging from ½ to 100 horsepower. Schramm ratings are given in actual air delivery at 100 p.s.i.g. and not piston displacement.

Write for a free copy of Schramm Catalog 51 10A for information on the complete line of Schramm industrial compressors and accessories.

SCHRAMM, INC.

The Compressor People

WEST CHESTER • PENNSYLVANIA

company's complete line of industrial equipment. Illustrated and described are its crawler tractors, wheel tractors, motor graders, wagons, motor scrapers, pull-type scrapers and bulldozers. A section also is devoted to pictures and data on allied equipment and attachments.

For More Details Circle No. 137—Page 214

POURING EQUIPMENT: Modern Equipment Co., Port Washington, Wis. — Profusely illustrated 52-page catalog provides detailed features, specifications, and dimensional drawings of a wide variety of pouring devices, auxiliary lifts, hand and geared ladles, ladle bowls, hand shanks, holding, mixing and desulphuring forehearths, and associated accessories. Crane and monorail systems that complement the company's pouring equipment also are presented as well as information concerning available consulting and layout service to synchronize the use of equipment to its greatest advantage.

For More Details Circle No. 138—Page 214

OVERHEAD CRANES: Ederer Engineering Co., 2931 First Avenue South, Seattle 4—Photographs of installations and detailed descriptions of the company's cranes, equipment and control devices are highlighted in bulletin CR-610. General specifications of crane components, operating speed charts and clearance charts provide helpful technical data.

For More Details Circle No. 139—Page 214

WELDING ACCESSORIES: Metal & Thermit Corp., 100 East 42nd St., New York 17—Illustrated catalog offers information on welding accessories including electrode holders, helmets, gloves, eye shields, ground clamps, cleaning tools, welding cable, protective clothing and many other related products.

For More Details Circle No. 140—Page 214

VIBRATING CONVEYORS: Hewitt-Robins Inc., Stamford, Conn.—Booklet 135-A describes line of vibrating conveyors. Illustrations show typical installations handling red hot steel castings, scrap metal, sand, shredded wood bark and crushed limestone. Technical details are included.

For More Details Circle No. 141—Page 214

THERMO PYROMETERS: Illinois Testing Laboratories Inc., 420 North LaSalle St., Chicago 10—The story of modern pyrometry with descriptions of the company's line of thermoelectric pyrometers is the subject of catalog 4181.

For More Details Circle No. 142—Page 214

LIFT TRUCKS: Lewis-Shepard Products Inc., Dept. R-44, Watertown, Mass.—Magazine features line of trucks, both hand and electric, with illustrations of industrial applications.

For More Details Circle No. 143—Page 214

call on

Foundry's PLUS 5 SERVICE

to put extra push behind your sales program

What is PLUS 5? It's your key to more business from foundries. It gives every FOUNDRY advertiser a bonus he can get from no other source. Here is help in analyzing this market—studying sales territories and potentials—planning the sales effort—and creating a constructive promotion program to the 5 billion dollar foundry market. It's time to take a new look at this market—and at the unusual selling aids we have for you. Say PLUS 5 to your FOUNDRY representative and he'll show you this 5-step program designed to move more of your products into foundries.

A Penton Publication

FOUNDRY

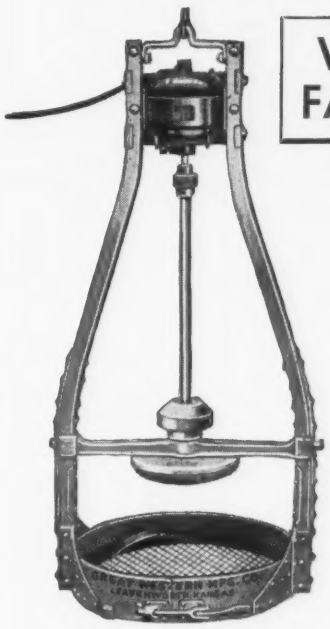
more than a magazine . . . a complete sales development service

Penton Building, Cleveland 13, Ohio

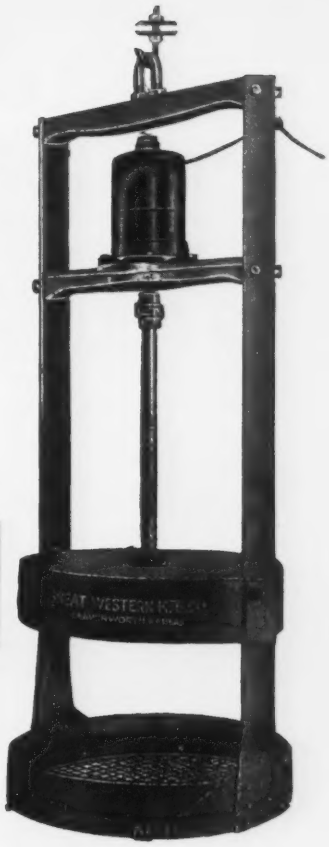
How to Solve the Riddle of: "WHICH RIDDLE?"

BUY THE BEST

COMBS FOUNDRY RIDDLES



WORLD FAMOUS!

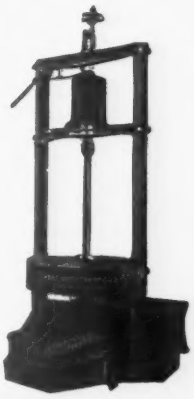


Type "CR"

24″ dia. round sieve. Thoroughly sifts, mixes, fluffs, aerates the sand. 1/3 H.P. enclosed motor. Height 4′ 6″, weight 250 lbs. Complete: $310.00

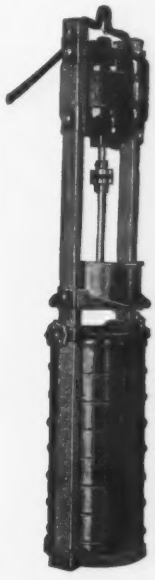
Type "V"

Screens sand Fine, Coarse, Medium 20″ dia. sieve with special clamp for 5-second changes. Does work of 10 men. Fully-enclosed 1/6 h.p. motor. 4′ 6″ high, weight 100 lbs. 20″ Sieve: $250.00. Giant V-5, 36″ Sieve: $450.00



Type "CS"

24″ square sieve. Continuous operation, no dumping. Refuse tails off to one side. Height 4′ 10″, weight 295 lbs. With 1/3 h.p. enclosed motor. Complete: $320.00



Type "HL"

Laboratory model . . . specially designed for sand control. Fitted with 1/6 H.P. motor. Price, complete less sieves: $225.00

Prompt Delivery from your Foundry Supply House

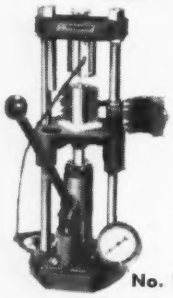
GREAT WESTERN MFG. CO.

LEAVENWORTH • KANSAS

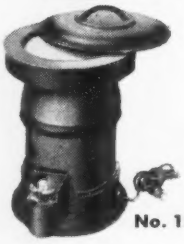
Buehler

Testing Equipment for the Foundry

Here are a few items selected from the complete Buehler line of metallurgical equipment. Write for new catalogue which describes and illustrates over 200 pieces of equipment.



No. 1315



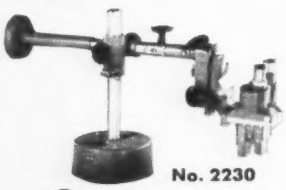
No. 1500

No. 1315 AB SPECIMEN MOUNT PRESS, complete with ejector, 10,000-lb. hydraulic gauge, 1" mold, heater and cooler.....**$190.00**

No. 1500 AB STANDARD POLISHER with 8" polishing wheel, cover, removable hand rest and splash ring. Motor and two-speed switch. **$185.00**

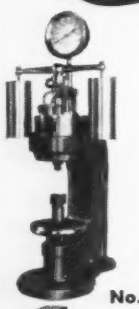
No. 2790

No. 2790 GC COMBINATION SAND RAMMER-COMPRESSION TESTER with loading device, pressure gauge, sand container and stripping post, on pedestal.....**$245.00**



No. 2230

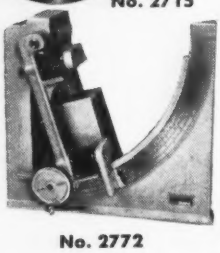
No. 2230 B & L WIDE FIELD MICROSCOPE SKW-5 with triple sliding nosepiece, 3 paired objectives 0.66x, 1.33x and 3x, 2 sets paired wide field eyepieces 10x and 15x **$426.00**



No. 2715

No. 2715 PITTSBURGH BRINELL MACHINE Style A, hand operated, for 3000 Kg. load.....**$395.00**

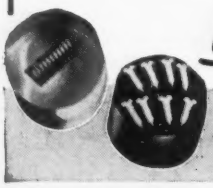
No. 2772 UNIVERSAL SAND STRENGTH MACHINE, hand operated, A.F.A. specifications. Equipped for green and dry compression test of molding sand.....**$229.00**



No. 2772

THE BUEHLER LINE OF SPECIMEN PREPARATION EQUIPMENT INCLUDES—CUT-OFF MACHINES • SPECIMEN MOUNT PRESSES • POWER GRINDERS • EMERY PAPER GRINDERS • HAND GRINDERS • BELT SURFACERS • POLISHERS • POLISHING CLOTHS • POLISHING ABRASIVES

Buehler Ltd.



METALLURGICAL APPARATUS

2120 Greenwood Avenue, Evanston, Illinois

GRAY IRON FOUNDRIES Simplify Chill Control . . .

with

TELLURIUM

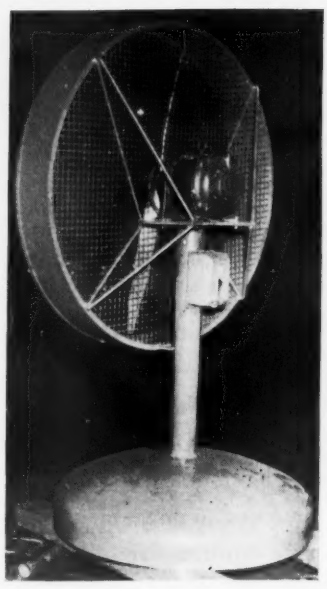
Available in 1, 2, 3, and 4-gram tablets; also in powder, slabs and sticks. For full information, write Dept. LM for 16-page article on the use of TELLURIUM in chill control.

American Smelting and Refining Company

120 BROADWAY • NEW YORK 5, N. Y.

HEAVY DUTY, STURDILY BUILT FAN

ONLY $295



Here is the fan that you wanted, but figured on paying more for. Look at these specifications: 3 HP motor, 1800 RPM, 3 phase, 220-440 volt, ball-bearing, 37000 CFM, 48" blade, 40" x 3/8" thick steel tank head base, 4" column, 52" dia. fan housing. This is a plain, ordinary working fan. It is built to do a job, and to last while doing it. Sold by the manufacturer, it is priced at only $295, f.o.b. N. Tonawanda, N. Y.

INDUSTRIAL MOTOR SERVICE

★★★★★★★★★★ 207 Vandervoort Street
North Tonawanda, N. Y.

DIE CAST POT

THEY STAND THE HEAT!

ACME { MELTING POTS
DIE CAST POTS
INGOT MOLDS

. . . for Melting Nonferrous Metals

Made of Special Formula Cast Iron

•

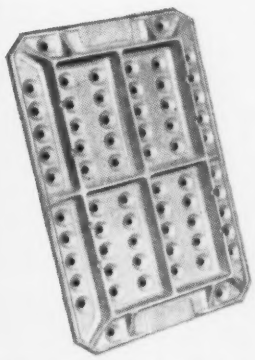
Write for Data Sheet on 40 Sizes

•

ACME FOUNDRY COMPANY
2502 22nd St.
Detroit 16, Mich.

SPOUT POT
NO. 550A

HOLDING BOWL
NO. HP7001



Underside view of the R & J aluminum-cleat bottom board. Both this and the R & J wood-cleat board are used by Zenith Foundry, West Allis, Wisconsin.

And Here's Why Zenith Foundry Co. Uses R & J Aluminum Bottom Boards—

1. No heavier than wood—but won't char, smoulder, or burn like wood.
2. Much cheaper than magnesium—and won't fuse.
3. R & J's are scientifically designed for extra strength, and properly vented for gas release.
4. R & J's are pound for pound less expensive than flimsier competitive brands.
5. R & J's stand up year after year.

R & J Aluminum Bottom Boards can be custom-made to meet YOUR particular requirement or design. For full details—price list—quotations, contact:

R & J Foundry Co. 610 South 94th St. Milwaukee 14, Wis.

CENTRIFUGALLY CAST

AUTOMOBILE CYLINDER LINERS

DIESEL ENGINE LINERS

BRONZE BUSHINGS

on the new
WATER-COOLED
Model M-WC
(Illustrated)

Utilizes low cost permanent molds of available steel tubing to produce gray machinable cast iron or bronze bushings.

Water cooled molds can be maintained at either high or low temperature easily. High or limited production in very small space with unskilled labor. Completely safe for workmen. Simple, sturdy equipment. Quick changeover from one mold to another. Practically 100% metal yield of high quality, denser castings. Metal porosity eliminated.

Write for new Bulletin # 153 Illustrating Model M-WC

RESEARCH FACILITIES

We have available an Experimental Foundry equipped for ferrous and non-ferrous melting for both vertical and horizontal centrifugal casting production. Our facilities are available to foundries for research or trial centrifugal castings at low cost.

Centrifugal Casting Machine Co.
P. O. Box 947 Tulsa 1, Okla.

GLUTRIN
LIQUID BINDER

GOULAC
DRY BINDER

For
CORE WORK, SAND FACINGS, SPRAYS

Write for pamphlets giving detailed information. Both materials carried in stock by America's foremost foundry jobbers

Robeson Process Company
(Established 1905)

American Gum Products Co.
(Established 1915)

GENERAL OFFICES: 500 FIFTH AVENUE • NEW YORK 18, N. Y.

Master Power
HARD CHROMED • PORTABLE PNEUMATIC TOOLS

DO MORE WORK AT LESS COST
because they deliver more power per cubic foot of air consumed, are light in weight for easier maneuverability and they retain their new tool power longer.

ARE PREFERRED BY OPERATORS
because they are lighter in weight, better balanced and designed to reduce shock and be free from vibration.

IF YOUR PROBLEM INCLUDES
chipping, ramming, grinding, buffing, sanding or wire brushing, *write us today for full particulars.*

THE MASTER PNEUMATIC TOOL COMPANY, INC.
ORWELL, OHIO • U. S. A.
SALES • SERVICE • STOCK • COAST TO COAST

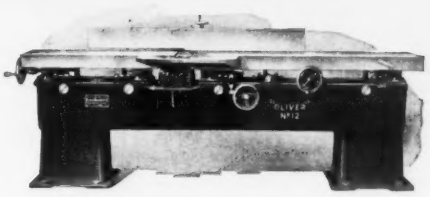
TERRE HAUTE
SPECIAL
FOUNDRY COKE

•

A QUALITY PRODUCT

Sold Exclusively by
REPUBLIC COAL & COKE CO.
8 South Michigan Ave., Chicago 3, Illinois
BRANCHES: Peoria • New York • Indianapolis • Milwaukee • Minneapolis • St. Louis
Detroit • Cleveland • Cincinnati
Manufactured at Terre Haute, Indiana by INDIANA GAS & CHEMICAL CORPORATION

Save time! Plane draft on pattern lumber . . . make perfect glue joints with this "OLIVER"



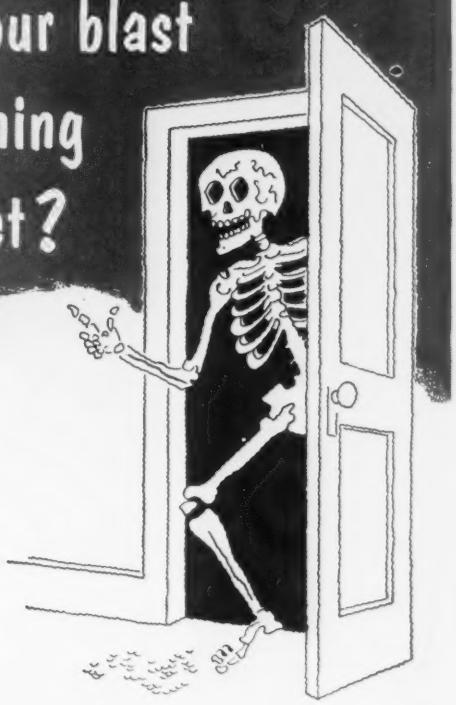
Here's one reason why this "Oliver" Jointer is the pattern-maker's favorite: the front table tilts sideways up to 5° for planing draft on lumber. The No. 12 makes easy work of planing long and short pieces of lumber. Tables adjustable for ¾" cut. Fence adjustable from square to 45° across table. Has new rabbeting attachment. Sturdy cabinet columns eliminate vibration. Three sizes: planes 20, 24, 30 inches wide. Write for Bulletin No. 12.

"Oliver" also makes heavy Jointers in 12" and 16" sizes

OLIVER MACHINERY COMPANY

Established 1890 **GRAND RAPIDS 2, MICHIGAN**

Have you a skeleton in your blast cleaning closet?



● How is your abrasive consumption? And what is maintenance costing you on your blast cleaning equipment?

If these two items constitute a skeleton in your blast cleaning closet it is time you heard the story of Controlled T chilled iron shot and grit.

Not only do you get rid of skeletons, but "Controlled T" *guarantees* you a 15% saving on your blast cleaning costs *regardless* of the price you may now be paying for chilled iron shot! The money you save on maintenance—on top of this—is all gravy for you—an extra dividend.

Get in touch with the Hickman, Williams office nearest you and ask for a free copy of "A Primer on the use of shot and grit."

NATIONAL CONTROLLED "T" SHOT AND GRIT IS PRODUCED EXCLUSIVELY BY

THE NATIONAL METAL ABRASIVE CO.
Cleveland, Ohio

WESTERN METAL ABRASIVES CO.
Chicago Heights, Illinois

AND SOLD EXCLUSIVELY BY

HICKMAN, WILLIAMS & CO.
(INCORPORATED)

CHICAGO • DETROIT • CINCINNATI • ST. LOUIS • NEW YORK
CLEVELAND • PHILADELPHIA • PITTSBURGH • INDIANAPOLIS

SUCCESSFUL FOUNDRIES EVERYWHERE

ARE SAVING MONEY WITH

SAFCO Core Oils...

★ LOWER CORE AND CASTING LOSSES
★ REDUCE SHAKE-OUT TIME AND LABOR
★ CUT CLEANING ROOM COSTS
★ DECREASE BAKING TIME
★ REDUCE CORE GAS AND SMOKE
★ ELIMINATE CORE-BOX STICKING

Foundries of every type and size are cutting losses and saving money by putting a SAFCO core oil to work for them. In the comprehensive SAFCO line there is the correct oil to fit your foundry practice and give outstanding performance...

WRITE FOR FREE LITERATURE — TODAY!
OIL PIONEERS FOR OVER 100 YEARS

SWAN-FINCH OIL CORPORATION
205 EAST 42nd STREET • NEW YORK 17, N. Y.
BUFFALO • CHICAGO • DETROIT • MEMPHIS

HEAVY-DUTY DEPENDABLE

Venturi Entrance Ring with tip seal creates efficient air flow
Aluminum Airfoil Propeller gives greater efficiency
Dependable Robbins & Myers "All-Weather" Motor
Heavy Welded Steel—Plate Motor Mount
12" to 60" Sizes—1020 to 85000 CFM Air Delivery
P.F.M.A. Certified Ratings

PROPELLAIR® TYPE CD FANS

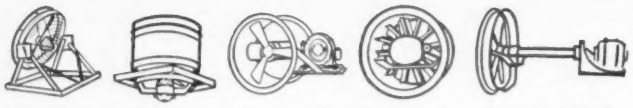
Use this versatile fan anywhere—for general duty ventilation in side-wall mountings or installed in Sky-Blast® roof ventilators or in hoods and ducts where high resistance is encountered. Modern Propellair Direct Connected Fans are ideal for removal of heat, dust, moisture, fumes, and smoke.

Single Name-plate Guarantee

Dependable Robbins & Myers motors in single phase or "All-Weather" polyphase designs give long, trouble-free service. Explosion-proof and glass insulated motors are also available. Propellair's single name-plate guarantee covers both fan and motor, and is backed by 22 years of research and engineering. Whatever your air moving problem may be, our engineers will be glad to make a survey and give you their recommendation. There's a rugged Propellair Fan for most applications.

Write for Bulletin 690-F

PROPELLAIR®
DIVISION OF ROBBINS & MYERS, INC.
SPRINGFIELD · OHIO



PHILADELPHIA COKE

PHILADELPHIA COKE COMPANY

4501 Richmond St.

Philadelphia 37, Penna.

PHONE: DELAWARE 6-3100

•

Producers of

FOUNDRY · METALLURGICAL

INDUSTRIAL COKE

SHORT CUT TO PROFITS

ohio MAGNETS

WELDED AND BOLTED TYPES • ALL SIZES • COMPLETE CONTROL EQUIPMENT • 28 YEARS A LEADER IN MAGNETIC MATERIALS HANDLING.

THE OHIO ELECTRIC MFG. CO. • 5400 DUNHAM ROAD • CLEVELAND, O.
Associate Member Institute of Scrap Iron and Steel, Inc. A-9096

HOW TO USE THE CUPOLA

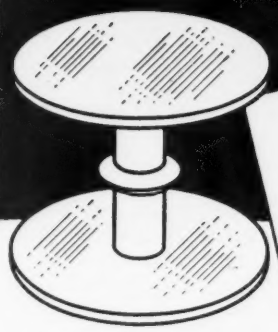
$1.00 Postpaid

NEW 36 PAGE HANDBOOK
by Bernard P. Mulcahy,
Pres. of Fuel Research Lab. Inc.

13 HELPFUL CHAPTERS ON ALL PHASES OF THE CUPOLA. "How To Use The Cupola" .... 13 idea-packed chapters based on the practical experience of a man who has devoted his life to foundry fuel and melting problems. It's a mighty useful handbook—a handy source of information which will pay for itself many times over in the months and years ahead.

Book Department
THE PENTON PUBLISHING CO.
1213 W. Third St. Cleveland 13, Ohio

no chance for leakage here



Buffalo CHAPLETS

Exclusive fin design of both Double and Single Head types assures positive fusion with molten metal. No recess in stem to weaken structure. Leakage problem is ruled out. Burns in more easily. Does not chill molten metal.

In addition, extensive variety of other types to meet your needs exactly. Since 1912, serving the nation's leading foundries. Trial samples without charge.

Complete information in Catalog No. 16

Manufactured by
Combined SUPPLY & EQUIPMENT CO., INC.
211 CHANDLER ST., BUFFALO 7, N. Y.

Sand is dumped into bins adjacent to mullers by Prime-Mover at Straight Line Foundry and Machine Corporation, Syracuse, New York.

Why Straight Line Foundry uses Prime-Mover to handle bulk materials

Large quantities of core and molding sand, and coke are used daily by Straight Line in the production of large gray iron and semi-steel castings.

Here is what John White, foundry superintendent at Straight Line, says about his Prime-Movers:

"We have one man and a Prime-Mover doing the work which formerly required 3 men and wheelbarrows. The unit is small enough to work in narrow aisles and up close where material is used. We use the Prime-Mover outside, too, over rough brick and dirt runways—all the year round, even through snow."

You can benefit with Prime-Mover advantages in your own plant.

THE PRIME-MOVER COMPANY
MUSCATINE, IOWA

THE Bell PRIME-MOVER

Problems with Castings?

"GATES AND RISERS FOR CASTINGS"
by Pat Dwyer, Engineering Editor, FOUNDRY magazine

- Recognized sourcebook of information on how to eliminate casting defects.
- Covers virtually all problems that arise in design and use of gates and risers for gray iron, steel, malleable, aluminum and brass-bronze castings.
- Simply written, easy to read text with detailed "how-to-do-it" drawings. This 3rd edition contains 31 chapters, 384 pages, 247 illustrations and is fully cross-indexed.
- Handy source of information which will pay for itself many times in the months and years ahead. Thousands of copies are already doing daily service in every type of foundry.

We invite you to examine "Gates and Risers" free for 10 days and decide for yourself how valuable it can be to you. At the end of that time, send us your check for $6.00, plus a few cents postage—or return the book without obligation. To get your copy just fill in and return the coupon below.

BOOK DEPARTMENT
Penton Publishing Co.
Penton Building
Cleveland 13, Ohio

Please send me a copy of "Gates and Risers for Castings" to examine FREE for 10 days.

NAME _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

Due to the patented Open Head design of this chaplet, sand is packed sounder under head and around the stem, thereby providing more rigid support for cores.

CLEVELAND CHAPLET & MFG. CO.
26470 Lakeland Blvd., Euclid, Ohio

WRITE FOR BULLETIN showing this and other types of Cleveland Chaplets.

CLEVELAND Chaplets
Since 1890

No. 4 DAYTON RING VALVE BENCH RAMMER

MORE POWER—MORE SPEED

You'll get more production with these faster, more powerful rammers and at the same time substantially reduce maintenance costs.

The Valve Units will last for years. The Cylinder Bores and Piston Rods are HARD CHROME PLATED which doubles the life of the Rammer. Many of the largest foundries in the country have already adopted them as standard. Made in six sizes to meet every requirement.

Send for Bulletin 300

DAYTON PNEUMATIC TOOL CO.
Manufacturers of Pneumatic Tools Since 1903
DAYTON, OHIO

34 years of fine pattern making

Danko has the background, the professional skill and the facilities to supply all your pattern needs, large or small. Precision performance and prompt service are routine at Danko. Phone or write today.

• Metal or wood match plates • Cope and Drag Machine Plates • Permanent Molds

DANKO PATTERN & MFG. CO., INC. • BALTIMORE 15 • MO. 4-8930

Westover ENGINEERS
FOUNDRY MANAGEMENT CONSULTANTS
3110 WEST FOND DU LAC AVE., MILWAUKEE 10, WIS.
There is no better time than NOW to review incentives, methods, scheduling, production control and paperwork processes.

HIGH SILICA QUARTZITE PEBBLES

★ ★ ★

R. W. SIDLEY, INC.
THOMPSON, OHIO TEL. 2701

10 GRADES OF WASHED, DRIED, SCREENED

SILICA FOUNDRY SANDS

Produced from celebrated Ottawa District St. Peter Sandstone • Rounded Grains
Steel Molding Sand • Core Sand • Blast Sand • Furnace Bottom Sand
Opener Sand • Sand for Non-Ferrous, Aluminum, Magnesium Castings
MICROSIL Ground Silica (5 Grades of Uniform, Pure White Silica Flour)

MICROSIL GROUND SILICA

STANDARD SILICA CORPORATION
209 South LaSalle Street, Chicago • and • Ottawa, Illinois
DISTRIBUTORS IN ALL PRINCIPAL CITIES

BLACKHAWK SILICA SAND

CLEANING COSTS GO DOWN...
PRODUCTION GOES UP...

when you use
AMERICAN SHOT AND GRIT

American cleans *better faster* because American is made of finest raw materials, produced by modern machinery and backed by years of metallurgical experience. The result is uniformly hardened and graded *solid* particles—free from strings and tails. All sizes; 100 lb. bags.

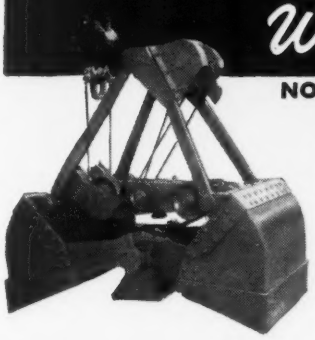
The AMERICAN STEEL ABRASIVES CO. GALION, OHIO

MEMBER FEMA FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION, INC.

EMPIRE
"THAT GOOD"
FOUNDRY COKE

DEBARDELEBEN COAL CORPORATION
2201 First Ave., North • Birmingham 3, Ala.
Phone 3-9135

WELLMAN
Williams Type



NO BUCKET-OPENING SHOCK ON CRANE HOOKS

The Wellman "Hook-on", single-line bucket provides you with clamshell bucket service at any crane hook where suitable head room and hoist capacity are available.

Both bucket and crane are protected against opening shock by a pair of adjustable snubbing sheaves. The snubbing action on the closing lines eliminates any shock when the bucket opens—an important feature since the operator cannot control opening speed of a single-line bucket.

Capacities from ⅜ to 2 cubic yards. Write for free bulletin.

THE WELLMAN ENGINEERING CO. 7044 CENTRAL AVE. CLEVELAND 4, OHIO

LENOX BAND SAW BLADES

CUT GATES AND RISERS FASTER!

The world's largest foundries now use LENOX band saw blades — because LENOX makes a special blade for cutting non-ferrous metals.

Tests show that the famous LENOX "Skip-A-Tooth" blades cut faster and last longer. LENOX "Skip-A-Tooth" has a coarse pitch and a round gullet for easy chip clearance.

Which type of blade is best for your cutting operations? Get the answer by writing us. No obligation, of course.

AMERICAN SAW & MFG. CO.
Springfield, Mass.

Please send me complete information on the LENOX Band Saw Blade for cutting Non-ferrous Metals:

☐ Aluminum ☐ Magnesium ☐ Brass ☐ Bronze

Name _____

Address _____

_____

Lightweight
RAILROAD JACKS
by **DUFF-NORTON**
another outstanding application of

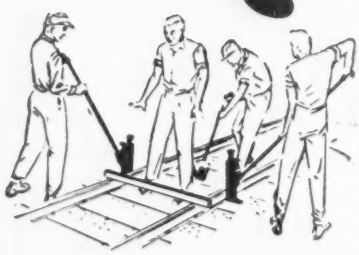
FRONTIER 40-E ALUMINUM ALLOY

Light as a Feather
STRONG AS AN OX

Under the stress and strain of track maintenance work a railroad jack must be sturdy—yet should also be *lightweight*, for easy portability to whatever locations are necessary.

For this essential dual role the Duff-Norton Manufacturing Company has found that FRONTIER 40-E Aluminum Alloy is ideal. World's oldest and largest manufacturer of jacks, Duff-Norton has made the new aluminum jack manufactured of 40-E an important addition to their line.

Frontier 40-E is a *naturally-aged* aluminum alloy that is performing with greater strength and shock resistance in a wide variety of industrial and commercial applications. Why not investigate the advantages of 40-E for *your* production, too?



Remember—if ALUMINUM can do it Better—FRONTIER 40-E ALUMINUM ALLOY can do it Best!

Write TODAY for full details about Frontier 40-E Aluminum Alloy, including FREE DATA BOOK

FRONTIER BRONZE CORPORATION
4878 Packard Road, Niagara Falls, N. Y.

No. 9-A Self-Dumping Swivel Wheel Bucket

PENN BUCKETS...

Careful balancing makes Penn Buckets self-dumping when loaded and self-righting when empty. Welded construction prevents "clinging", makes them empty easily and completely. The swivel wheel increases handling efficiency, too.

WRITE TODAY FOR NEW BULLETIN AND DIMENSION SHEET

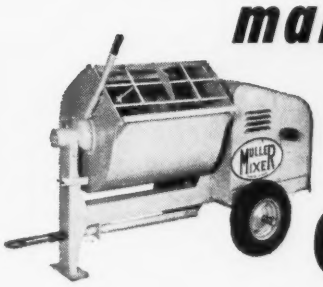
PENN IRON WORKS, INC.
READING, PENNA.

CROBAUGH LABORATORIES
Chemists—Metallurgists
FOUNDRY SERVICE
THE FRANK L. CROBAUGH CO.
Phone SUperior 1-4712 CLEVELAND 13, O.

FOUNDRY
EDWIN S. CARMAN, INC.
LEE ROAD AT MAYFIELD
CLEVELAND 18, OHIO
A COMPLETE FOUNDRY SERVICE
CONSULTANTS

SERVING THE FOUNDRY INDUSTRY SINCE 1907
CRUCIBLES (all types)
RETORTS, GRAPHITE SHAPES
SUPER REFRACTORIES, FLUXES
BAY STATE CRUCIBLE CO. TAUNTON, MASS.
TEL. TAUNTON 4-5121

BETTER CORES *make* BETTER CASTINGS



You can save time and money and make better cores with the Muller New 3½ Cubic Foot Core Sand Mixer. It mixes 250-300 pounds per batch. Better cores mean better castings. This new, labor-saving Core Sand Mixer will "buy itself" out of savings in a short time.

PRICE: $356.00 complete with 1½ H. P. Electric Motor ready to plug in, F. O. B. Metuchen, New Jersey.

This Mixer is also available in 2, 6, 6 to 8, and 9 Cubic Foot sizes.

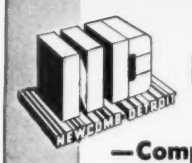
MULLER MIXER

MULLER MACHINERY COMPANY, Inc.

Metuchen 14, N. J. Cable Address: MULMIX

NEWCOMB-DETROIT

PIONEERS IN ENGINEERING, MANUFACTURING & INSTALLING OF



"Uni-Wash" **DUST COLLECTORS**

Recirculating Water Type —Compact—Efficient—Proven by Foundry Users

•

"Scroll-Aire" **CORE OVENS**

More Air Circulation— Faster Bake and Better Cores

ESTABLISHED 1912

- **DETROIT DIVISION**
- **GRAND RAPIDS DIVISION**
- **NEWCOMB INDUSTRIES, LTD., WINDSOR DIVISION**

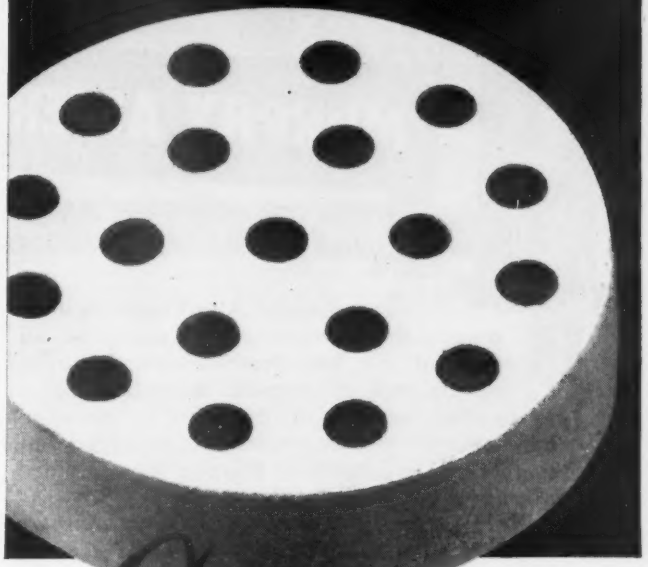
For Bulletins and Quotations, Wire, Write or Call—

NEWCOMB-DETROIT

5755 Russell St., Detroit 11, Mich.

TR 3-2100

PORCELAIN PRODUCTS



Ceramic STRAINER CORES

1. **Pay for themselves.**
2. **Reduce scrap losses.**
3. **Cut machining time.**
4. **Reduce chipping, welding, grinding.**
5. **Improve casting quality.**
6. **Eliminate time spent making your own strainer cores.**

At surprisingly low cost, you can have *all* the advantages of Porcelain Products Ceramic Strainer Cores. They provide a *positive* method of controlling pouring speeds—turn out *clean* castings, free from slag and sand inclusions. You can specify Porcelain Products Ceramic Strainer Cores in a wide variety of standard sizes—or in sizes designed for your special needs. Literature, prints and samples available upon request.

60 years

PP INC.

Porcelain Products, Inc.

FINDLAY, OHIO

NOW! POSITIVE MOISTURE REMOVAL

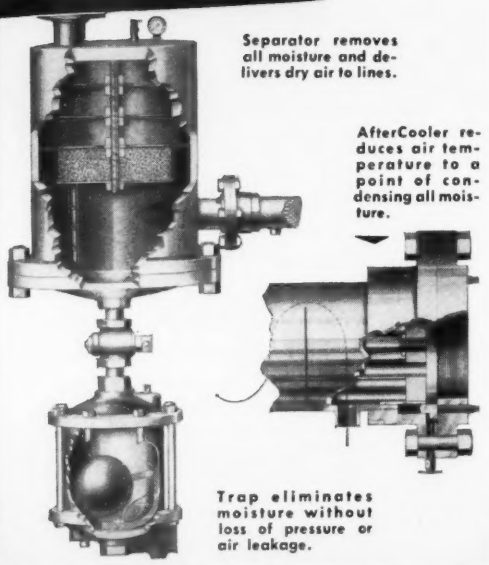
FROM COMPRESSED AIR LINES WITH THE

MURPHY AFTERCOOLER SYSTEM

The Murphy AfterCooler System guarantees the elimination of water in all compressed air line installations. Installation is simple and unit requires a minimum of maintenance. For cool, clean, dry air . . . for eliminating "down time" in compressed air operated tools and equipment . . . install a Murphy AfterCooler System in your plant now!

Write today for Bulletin No. 1, outlining complete details on the Murphy AfterCooler System!

GUARANTEED COMPRESSED AIR PRODUCTS
AFTERCOOLERS • SEPARATORS • STRAINERS
TRAPS • SPRAY GUNS • PISTOL SPRAYERS


Separator removes all moisture and delivers dry air to lines.
AfterCooler reduces air temperature to a point of condensing all moisture.
Trap eliminates moisture without loss of pressure or air leakage.

JAS. A. MURPHY & CO. INC.
1421 HIGH STREET • HAMILTON, OHIO

CLASSIFIED ADVERTISING

Help Wanted

SALES ENGINEER

Modern, progressive, medium sized jobbing foundry in Southwest community of 20,000 has excellent staff opening for an aggressive sales minded man of potential executive caliber who feels that his present opportunity may be limited. Required qualifications: Graduate Engineer; 5 to 10 years experience in a foundry or an industry using many castings; malleable background or familiarity preferred; age 30-40; willing to travel. Our people know of this ad. Give all details and photograph in reply which will be held confidential.

BOX 231
FOUNDRY CLEVELAND 13, OHIO

SALES ENGINEER

The Taylor-Wharton Iron and Steel Company, producers of manganese and alloy castings, has an opening for an aggressive sales engineer possessing a sound knowledge of sales and engineering as well as having contacts throughout the middle west with particular reference to Minnesota, Wisconsin and Michigan.

Basis of remuneration consists of salary plus liberal commission. Applicants should furnish complete resume to:

DIRECTOR OF INDUSTRIAL RELATIONS
TAYLOR-WHARTON IRON AND STEEL COMPANY
HIGH BRIDGE, NEW JERSEY

Help Wanted

PERMANENT MOLD DESIGNER

Must be experienced. State qualifications and salary expected.

BOX 198
FOUNDRY CLEVELAND 13, OHIO

PLANNING SUPERVISOR

Steel foundry organization desires services of man with initiative, originality and pattern background. Age 35-45. Wide experience in steel foundry rigging practices required.

BOX 247
FOUNDRY CLEVELAND 13, OHIO

FOREMAN

(MALLEABLE FOUNDRY)

High production; machine (floor) molding of pipe fittings; practical molding experience, ability to handle men essential.

THE GRABLER MANUFACTURING CO.
6565 BROADWAY CLEVELAND 5, OHIO

Help Wanted

WE NEED

METHODS ENGINEERS IN OUR STANDARDS AND METHODS ENGINEERING DEPARTMENT

College Graduates with Experience

in

Foundry Time Study Work Preferred

BOX 246
FOUNDRY CLEVELAND 13, OHIO

SUPERINTENDENT

Gray iron foundry with capacity 40 to 50 tons daily, located Lower Michigan. Produces light and heavy castings on jobbing floors, squeezers and rollovers. Excellent opportunity for well trained, capable, aggressive man. Plant well equipped and company strong financially with outstanding earnings record. Expansion program now being planned. Age 50 or under.

BOX 244
FOUNDRY CLEVELAND 13, OHIO

Help Wanted

METALLURGIST

Taylor-Wharton Iron and Steel Company has an opening for a Plant Metallurgist at its High Bridge, New Jersey foundry. Applicants should be thoroughly familiar with a wide variety of alloy steels as well as have a background of supervisory responsibility.

This position offers an unusual opportunity to an aggressive man between the ages of 32 and 40.

When applying, provide full resume of past experience, together with list of references for checking. All inquiries should be sent to:

DIRECTOR OF INDUSTRIAL RELATIONS
TAYLOR-WHARTON IRON AND STEEL CO.
HIGH BRIDGE, NEW JERSEY

FOREMAN
(METAL PATTERN SHOP)

Experience in production of pipe fittings (Brass-Gray Iron-Malleable) helpful but not necessary. Ability to supervise essential.

THE GRABLER MANUFACTURING CO.
6565 BROADWAY CLEVELAND 5, OHIO

WANTED

Method and Time Study Engineer.
Relocate Middlewest.
Gray iron foundry experience required.
Jobbing shop.

BOX 192
FOUNDRY CLEVELAND 13, OHIO

WANTED

Gray iron foundry located in Southeastern Michigan needs pattern set-up man. Must have gating and risering experience on squeezer patterns. Salary and working conditions good. Address: Box 227, FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

FERROUS FOUNDRIES

Technical education and seventeen years' varied experience in foundry practice. Employed now. Desire change for valid reasons. Thoroughly qualified in sand control, iron and steel, green sand and cores, cupola operation and metallurgical control of gray and white irons, plain or alloy. Considerable annual savings possible in most foundries, especially steel, in sand field and closely related details. Available September 1st for position dealing with management. Competent sand control is a specialized field. Most foundries are paying much more in materials wasted, scrap, excessive cleaning costs, through inexperienced and haphazard direction than a competent sand control program costs. Experience in reclaiming sand. Locations favorably regarded include: Midwest, Central Canada, Vancouver, Pacific Northwest, Colorado, San Francisco, Pennsylvania, New York. Address: Box 224, FOUNDRY, Cleveland 13, Ohio.

GRAY IRON FOUNDRY EXECUTIVE

Well versed in all phases of foundry procedures available. Molding, light and heavy. Green and dry sand. Coremaking, cupola operation, gray iron metallurgy, foundry costs, customers contacts. Thirty years foundry executive experience various capacities. Presently employed. Address: Box 218, FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

Thorough knowledge of all phases of nonferrous metals. Understand gating, jobbing, floor, machine and plumbers supplies. Can also produce pressure tight and porous free castings. Know sand control and core room work. Address: Box 248, FOUNDRY, Cleveland 13, Ohio.

FOUNDRYMAN

Superintendent or general foreman. Practical man. Twenty-seven years' experience in gray iron and nonferrous jobbing and high production shops. Now employed. Western or central New York preferred but not essential. Address: Box 216, FOUNDRY, Cleveland 13, Ohio.

PRACTICAL FOUNDRYMAN AND METALLURGIST

Seeking sales representation of manufacturer of foundry equipment or foundry materials. Sales results guaranteed. References furnished. Address: Box 230, FOUNDRY, Cleveland 13, Ohio.

SAND TECHNICIAN

Experinced in green, dry, skin dry and cement sands. Knowledge of core sands. Address: Box 237, FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

FOUNDRY ENGINEER

Age 30, degree in metallurgy. Experience in both cast steels and cast irons. Good background of foundry supervisory experience. Have time and motion study experience coupled with incentive system installation and its supervision. Address: Box 236, FOUNDRY, Cleveland 13, Ohio.

FOREIGN POSITION DESIRED

As foreman or superintendent. Well versed in foundry methods. Experienced in mining machinery castings, also nonferrous experience. Married, age 41. Last fourteen years in supervisor's capacity. Address: Box 250, FOUNDRY, Cleveland 13, Ohio.

FOUNDRYMAN

Manager, superintendent or general foreman. Twenty-three years' experience in all phases of foundry operations and supervision. Gray, semi-steel, Meehanite and nodular irons, green and dry sand, jobbing or high productions. Age 42. Address: Box 252, FOUNDRY, Cleveland 13, Ohio.

FOUNDRY FOREMAN OR SUPERINTENDENT

Desire position in medium sized foundry. Well versed in cupola and sand control, jobbing or production shop. Age 41, married. Last 14 years in supervisor's capacity. Two years M.I.T. Address: Box 249, FOUNDRY, Cleveland 13, Ohio.

MANAGER OR SUPERINTENDENT

Progressive and capable executive. Practical and technical experience in the production of all types of ferrous castings, from an ounce to 20 tons. Sixteen years' executive experience. Address: Box 240, FOUNDRY, Cleveland 13, Ohio.

FOUNDRYMAN—IRON OR STEEL

Looking for a good place to work. Fifteen years in supervisory experience covering all phases of foundry activities with particular emphasis on cupola and electric furnace melting, metallurgical and sand controls, heat treating, inspection, sales, and customer correspondence. College background. Age 39, located in midwest. Will go anywhere. Address: Box 207, FOUNDRY, Cleveland 13, Ohio.

GENERAL COREROOM FOREMAN

Jobbing or production coreroom, large or small work. Good rigger for coreblowers, rollover machines, bench, floor work. Well versed in sand control, drying and assembling of cores. Cost and production minded. Address: Box 242, FOUNDRY, Cleveland 13, Ohio.

SALESMAN

Presently employed. Have successful sales background; desire sales position with future. Prefer locating in New York State or Eastern United States. Energetic and aggressive. Address: Box 241, FOUNDRY, Cleveland 13, Ohio.

SUPERINTENDENT OF MAINTENANCE

Desire position with highly mechanized gray or malleable iron foundry. Have a record for increasing production, handling labor, man hours and controlled maintenance. Address: Box 238, FOUNDRY, Cleveland 13, Ohio.

SOUTH AMERICA

Foundry superintendent at present in charge of machine shop and gray iron foundry of a chemical company, desire to relocate in South America. Experienced also in steel, malleable, nonferrous foundries. Willing to take major part of salary in currency of the country located. Speak Portuguese and Spanish. Age: 40 years. Technical education. Address: Box 189, FOUNDRY, Cleveland 13, Ohio.

METALLURGIST

Eighteen years' experience all phases foundry work. Can make ductile iron with 15 to 25 percent elongation as cast. Close control of any kind of metal. Address: Box 243, FOUNDRY, Cleveland 13, Ohio.

FOUNDRY EXECUTIVE

Thoroughly experienced in the management of gray iron production or jobbing foundries. Qualified to show you a highly efficient and low cost operation. If you are interested, Address: Box 214, FOUNDRY, Cleveland 13, Ohio.

EXECUTIVE

Experienced in all phases of foundry operation and management with thorough knowledge of each shop process, engineering, metallurgy, cost estimating and accounting, sales and industrial relations. Technical graduate. Excellent recommendations. Address: Box 239, FOUNDRY, Cleveland 13, Ohio.

SALES OR ADMINISTRATION

College graduate, business administration. Apprentice school graduate (foundry practice) with five years practical foundry experience. Desire position in sales or administration. Address: Box 220, FOUNDRY, Cleveland 13, Ohio.

CLASSIFIED ADVERTISING

Representatives Wanted

SALES REPRESENTATIVES WANTED

To handle high-grade refractory products for foundries and steel mills in New England, New York-New Jersey, Eastern Pennsylvania-Delaware, and southeastern states. If you are qualified, write:

BOX 229
FOUNDRY CLEVELAND 13, OHIO

SALES REPRESENTATIVE WANTED

Well established foundry in upstate New York wants qualified casting salesman. Commission basis. Prefer man with established customer relations. Castings from ounces to five tons. Castings only—rough machined or completely machined.

BOX 228
FOUNDRY CLEVELAND 13, OHIO

WANTED

Salesman—by long established manufacture of refractories. Applicant should have experience in industrial selling, preferably to metal melting industries. Prefer applicant between 27-35 years. Must be willing to travel. Address: Box 235, FOUNDRY, Cleveland 13, Ohio.

SALESMAN

For light gray iron foundry located in Northern Ohio. Give full particulars of previous experience and salary expected. Address: Box 245, FOUNDRY, Cleveland 13, Ohio.

OPPORTUNITY

Bright future for right man experienced in selling foundry supplies and equipment. Long established firm in Los Angeles, California. Write full details. Address: Box 225, FOUNDRY, Cleveland 13, Ohio.

Engineering Service

FOUNDRY TECHNICAL SERVICE
FOR
STEEL, MALLEABLE, AND GRAY IRON FOUNDRIES

The purpose of this Service is to establish sound, stable foundry practices in all production departments. To promote reduction in scrap and cost; to better quality of casting thereby giving improved service to the customers.

INQUIRIES ARE SOLICITED.

HERBERT F. MILLER, CONSULTANT
FOUNDRY ENGINEERING SERVICE
718 WEST SECOND STREET
MARION, INDIANA

NEW DEADLINE FOR CLASSIFIED SECTION

RESERVATIONS FOR SPACE MUST BE MADE NO LATER THAN THE

10TH

OF THE MONTH.

Space cannot be guaranteed for advertisements received after this date.

Employment Service

FOUNDRY PERSONNEL SPECIALISTS
National Placement and Procurement of

GENERAL AND PLANT MANAGERS, PLANT SUPERINTENDENTS, FOREMEN—ALL DEPARTMENTS, METALLURGISTS, ENGINEERS, CONTROLLERS, ACCOUNTANTS, SALESMEN, SALES MANAGERS, PERSONNEL DIRECTORS, PURCHASING AGENTS.

Confidential Inquiries Invited
From Employers and Qualified Applicants.

For Fast Competent Assistance Contact

JOHN COPE, DIRECTOR — **37 S. WABASH, CHICAGO 3, ILL.**
IMPERIAL PERSONNEL — **FRANKLIN 2-4233**

SALARIED PERSONNEL
$3,000-$25,000. This reliable service, established 1927, conducts confidential negotiations for high grade men who seek a change of connection under conditions assuring if employed full protection to present position. Send name and address only for details. Personal consultation invited. Address: JIRA THAYER JENNINGS, 241 ORANGE STREET, NEW HAVEN 10, CONN.

Wanted-To-Buy

WANTED TO BUY

Always in the market for surplus used foundry equipment. Contact us before selling. Interested especially in complete plants. Will travel anywhere.

AAA MACHINERY & EQUIPMENT CO.
15539 SARANAC ROAD
CLEVELAND 10, OHIO — **LI 1-6545**

WANTED
MAGNESIUM CHIPS

We pay top prices for Magnesium Chips, Borings, Cuttings, Shavings, etc.

STANDARD MAGNESIUM CORP.
7600 EAST 41st STREET
TULSA, OKLAHOMA

WANTED TO BUY

Used Detroit Electric Arc Melting Furnace approximately 350-500 pound capacity. Give price and complete description.

BOX 233
FOUNDRY — **CLEVELAND 13, OHIO**

MIXERS WANTED
Used Simpson Intensive Sand Mixers. State size, condition and lowest cash price or immediate acceptance. Address Box 578, FOUNDRY, Cleveland 13, Ohio.

MACHINERY WANTED
Induction Furnaces, Screens, Simpson Mixers, Riehle Compression Testing Machines, Pulverizers, Grinders, Conveyors. Address: CONDENSER SERVICE & ENGINEERING CO., INC., HOBOKEN, NEW JERSEY, BA 7-0600.

WANTED
Three inch and four inch soil pipe fitting patterns. Address: FLOYD GOLDEN, BRIGHTON, MICHIGAN.

Foundry Work Wanted

LOWEST COST
Top quality guaranteed. Foundry and machine shop work. Low taxes. Low wage scale. Send drawings for prompt low price quotation. Address: AMERICAN FOUNDRY AND MACHINE SHOP, APARTADO 2610, MEXICO CITY, MEXICO.

Opportunity

BRAINS FOR SALE

$500.00 per year.

Any foundry can make

superior castings.

BOX 234
FOUNDRY — **CLEVELAND 13, OHIO**

Foundries For Sale

FOUNDRY FOR SALE

Well-equipped operating gray iron foundry, all or in part. 18,000 square feet floor space, with concrete and asphalt floors on 2½ acres ground. Roll-over machines, wheelabrator, sandcutter, etc. Has grossed over $40,000.00 per month, capable of more. Illness forces sale, or will lease—$1250.00 per month. Will consider percentage basis. Located fourteen miles from Los Angeles City Hall.

BOX 232
FOUNDRY — **CLEVELAND 13, OHIO**

FOUNDRY FOR SALE

Gray iron foundry and product. $200,000 a year volume. Selling price, $45,000. Central Pennsylvania.

BOX 221
FOUNDRY — **CLEVELAND 13, OHIO**

FOUNDRY FOR SALE

Small gray iron foundry in Southern state which leads the South in industrial expansion. Opportunity for one with "know how" and small capital to own profitable business. Address: Box 142, FOUNDRY, Cleveland 13, Ohio.

FOR SALE

Brick and steel foundry, Southern Illinois, 160 x 320 feet, overhead monorail, water transportation available. Ideal for mechanized operation, contains equipment. Address: Box 200, FOUNDRY, Cleveland 13, Ohio.

FOR SALE OR LEASE

Well equipped brass and aluminum foundry in central Indiana. Now operating. Address: Box 179, FOUNDRY, Cleveland 13, Ohio.

FOR SALE

Foundry, machine shop, sheet metal shop and residence. Will sacrifice for $21,000.00 cash. Reason for selling other interests. Write Box 1442, Minot, North Dakota or phone 48-140.

For Sale

FOR SALE

1—Tinius Olsen 100,000# Universal Compression Testing Machine
1—Magnaflux Demagnetizing Unit
Simpson Sand Mixers 18" dia. Laboratory #0 #1, #1½, #2, #3
Miscellaneous: Screens, Pulverizers, Grinders, Conveyors—all types, Tyler Rotap Screens, etc.
OUR 37TH YEAR

CONSOLIDATED PRODUCTS CO., INC.
66 BLOOMFIELD STREET
HOBOKEN, NEW JERSEY
HO 3-4425 — **N.Y. TEL. BA 7-0600**

FOR SALE

SPO Jolt Squeeze, Clamp Power Rollover, Power Draw Molding Machine, Model 9336, Serial 9336-120. Good Condition—Used very little . . $800.00
Johnson & Jennings #918, Serial A6520BP Molding Machine. Very little use $500.00
Ingersol Rand, Type Imperial XB Air Compressor, Duplex Belt Driven 327 CFM, Size 12 x 7½ x 12. Including motor, controls and belt. Very good machine $675.00

PERU FOUNDRY COMPANY
PERU, INDIANA

For Sale

FOR SALE

DIELECTRIC CORE OVENS—Model 900A and Model 1800A; Conveyor Type
Osborn Core Blowers—Models 91, 94 and 193.
Herman Jar Rollover & Pattern Draw; 1944; 48" x 144"; 10,000# Series
Int'l. JDP Pattern Draw; 600 lb.; 8" draw
Int'l. LP6 Jolt Squeeze Pin Lifts
#2047 Osborn Jolt Rollovers
#601 Osborn Jolt Rollovers
#602 Osborn Jolt Rollovers
#275J Osborn Jolt Squeezers
8' Pangborn Tableblast
48" x 48" American Wheelabrator-Tumblast
Fremont Slip Flasks—various sizes
Chicago Pneumatic Air Compressor—220 HP Diesel Operated
Marshke Swing Frame Grinder—10 HP
FOR THE BEST DEAL CALL
BALCHER MACHINERY COMPANY
6020 EUCLID AVENUE
CLEVELAND 3, OHIO
TELEPHONE: EXPRESS 1-6909

ATTENTION:
PNEUMATIC TOOL USERS

200 never used tools and many hundreds of rebuilt Chippers, Rammers, Riveters, Grinders, etc. at substantial savings.

Very large stock of spare parts, Standard and O/S.

Complete repair service on your tools by refitting parts or rebuilt to original sizes with HARD CHROME.

30 years' experience handling all makes and models.

Send us your next tools as a trial. Satisfaction guaranteed or money refunded. Estimates furnished.

THE PNEUMATIC TOOL PRODUCTS CO.
1340 EAST 222nd ST.
EUCLID 17, OHIO
PHONE: KE 1-4990

FOR SALE

1 Transformer
1500 KVA
33 Cycle
11,500 volts to 138 volts
Manufactured for:
Pittsburgh Lectromelt Furnace Corp. by Penna Transformer Co., Cannonsburg, Pa.

ELECTRIC STEEL FOUNDRY COMPANY
2141 NORTH WEST 25th AVENUE
PORTLAND 10, OREGON

FOUNDRY CLOSED

For sale 1 Demmler Core Blower, Style #2. For 20 lb. cores, with all clamping equipment and spare parts. In good shape. Price $250.00. 1 S & B Sand Cutter in perfect condition, 5HP, 220/440 drive. 36" x 5' reel, used three months. Will sell for one-half cost.

BOX 251
FOUNDRY — **CLEVELAND 13, OHIO**

CARBON & GRAPHITE
Blocks—Plates—Rounds
MOTOR AND GENERATOR BRUSHES
of all types. Original equipment and repacement. Quick delivery from stock. Substantial savings.

BECKER BROS. CARBON CO.
BASIC MANUFACTURERS SINCE 1890.
3448 S. LARAMIE — **CICERO 50, ILLINOIS**
BIshop 2-1260

FOR SALE
DETROIT ELECTRIC FURNACE

Type AA of 1,200 lb. cold metal or 2,600 lb. hot metal capacity, complete with mechanical and electrical equipment for melting and rocking, including oil filled transformer of 11,000 v. primary and 125 v. secondary. Presently crated but available for inspection on 48 hours notice. Ideal for high test cast irons, brasses or bronzes. Price: $9,500.00. Address: HOPE ELECTRICAL PRODUCTS CO., 338 WILSON AVENUE, NEWARK 5, N. J.

FOR SALE

Two No. 1 Wheelabrator Multi-Table machines, serial No. A-66826 and A-66926, complete with $1780.00 in spare parts, also dust collectors at $2500.00 each. One machine presently in operation. Address: SHERMAN & REILLY, INC., FIRST & BROAD STREETS, CHATTANOOGA, TENN.

HINES SLIP FLASKS

22 x 32", 6" cope, 4" upset, 7" drag, with jackets; 14 x 18", 5" cope, 4" drag. Address: JARDINE BRONZE FOUNDRY, INC., P. O. BOX 129, BALDWINSVILLE, NEW YORK.

FOR SALE

MOLDING MACHINES

7—**S P O** No. 110J Portable Jolt Squeezers.
2—**S P O** No. 506 Jolt Rollover Pattern Draw, 600 lbs. Cap., 10" Draw, 24" x 25" Table.
6—**OSBORN** No. 275J. Jolt Squeeze Machines portable and stationary models.
3—**OSBORN** No. 559 HD Jolt Strippers, stationary. Table 25" x 30". Jolt 1200 lbs.
3—**OSBORN** Model 601. Jolt, Rollover, Pattern Draw. 600 lbs. cap. Flask 30".
1—**OSBORN** No. 333 H Jolt, Squeeze, Power Rollover, Pattern Draw, 2000 lbs., Jolt, 22" x 44" Table Jolt Cyl. 12", Draw 22".
2—**OSBORN** No. 142 Jolt, Rollover, Foot Draw 14½" x 24" Table Draw 8", 350 lbs. capacity.
1—**JOHNSTON & JENNINGS** #401-C, Portable Jolt Squeezer.
1—**JOHNSTON & JENNINGS** Model 1216S Stationary Jolt Pin Lift, table size 36" x 54". Draw 16". Capacity 3000 lbs.
1—**TABOR** Jolt Rollover and Pattern Draw, Draw 10". 600 lbs. Capacity. 22" x 42" Table. Shockless Jar. Portable.
2—**TABOR** 30 x 40 Jolt Rollover and Pattern Draw Machines, 1000 lbs. cap., 12" draw.
2—**INTERNATIONAL** Model LJSD Double Head Jolt Squeezer Table, 20" x 16", 12" squeeze cylinder.
1—**INTERNATIONAL** Model PKL. Jolt Squeeze. Air Pin Lift Machines. 18" x 24" Table, Lift 5½", Squeeze Cyl., 12".
1—**INTERNATIONAL** Model MJ, 16" x 4" Draw. Power Jolt Hand Rollover.
2—**INTERNATIONAL** Type "HJ" Jolt Ram, Hand Turnover, Foot or Hand Lever Draw Machines. Various sizes.
4—**INTERNATIONAL** Type G, Air Jolt, Air Turnover Foot Draw Machines, Sizes 20" x 8"—24" x 8"—30" x 8"—24" x 10".
2—**CHAMPION** JS-10-P. Jolt Squeezer, Portable, Serial No. 5770, Table size 18" x 26". 10" squeeze cylinder.
1—**CHAMPION** Model No. JM 16 Serial No. 5092. Power Jolt, Hand Turnover, Foot Draw Machine 13" x 17" table.
1—**DAVENPORT** 2SARO Jolt Rollover and Pattern Draw 28 x 40 table, 12" draw, 1500 lbs. capacity. 1945 unit. Like new.

MULLERS

2—**BEARDSLEY & PIPER** #3½ Mulbaros.
1—**BEARDSLEY & PIPER** No. 60 Speed Mullers, 10 cu. ft. w/motor and drive.
2—**SIMPSON** No. 0 Sand Muller, 175 lbs. batch size with motor and drive.

SAND PREPARATORS

1—**ROYER** Model C-2 Sand Conditioner, portable, 25 to 30 tons per hour.
2—**ROYERS MODEL NC 4 SAND CONDITIONERS, 12 to 15 TONS PER HOUR. RUBBER AND STEEL TIRE UNITS.**
1—**AMERICAN** Sand Cutter, Model M, size 79 x 60.
1—**ROYER** Shakeout and portable sand conditioning unit.

AIR HOISTS—ELECTRIC HOISTS

2—**INGERSOLL RAND,** Size D, 4000 lbs.
1—**INGERSOLL RAND,** Size B 1000 lbs.
1—**LITTLE GIANT,** Model A, 1000# cap.
1—**THOR PNEUMATIC,** 1000 lbs. capacity.
1—**SHEPPARD** 5-Ton D.C. Hoist, 6 H.P. Motor, 230 V.
1—**ELECTRO-LIFT,** 3000 lbs cap. 220/440 low head room cable hoist.

SHAKEOUTS

1—**SIMPLICITY** Shakeout, 4' x 6', Serial No. 46—SOB—145, Model B.
2—**SIMPLICITY** Shakeouts, 4' x 8', Serial No. 48—SOBG—185 Model BG 5,000 lbs. capacity.

BLOWERS

1—**BUFFALO FORGE** No. 7-E Blower, 25 H.P., 3600 rpm, 220/440 volts, 28" wheels, 32 oz., 1600 cfm.
5—**FURNACE BLOWERS,** 2-3-5-7½ HP, 16 oz.

CONVEYORS—Apron - Roller - Belt

500'—**MATHEWS** Roller Conveyor. Above Rail 20" wide, 2½" Rollers, on 4" Centers.

CORE OVENS

1—**COLEMAN** Core Oven, gas fired, 2 doors, 6' high, 5' wide, 4' deep. W/burners.
2—**DISPATCH,** Gas Fired, Drawer Type Core Ovens. Drawers 46" wide, 59" deep, 9" high w/rail supports, controls.

CORE BLOWERS

1—**OSBORN** No. 91, Serial No. 10050.
2—**OSBORN** No. 92 Core Blowers. Serial No. 9703A and 8692-C, Air Clamps.
1—**DEMMLER,** No. 1-E Core Blower, Serial No. 3287. Air Clamps, 1950 unit.
1—**DEMMLER** No. 2 with Air Clamps.
2—**REDFORD** No. 1, Cartridge Bench Type.

GRINDING EQUIPMENT

1—**FOX** Stand Grinder #5, single wheel, size 24" x 2", 10 H.P. 220/440 V.
1—**HAMMOND** Model WR-1 Double End Snagging Grinder, 7½ H.P. 220/440/3/60.
2—**HAMMOND** Model WH-10 Double End w/2—7½ HP, 220/440, wheel size 20" x 2" x 2".
2—**U. S. ELECTRIC** Double End Snag Grinders 20" Wheel, 5 H.P. Motor.
1—**QUEEN CITY** Model 100 Double End Disc Grinder with 10 H.P. 220/440 Volt Motor size 20" x 2" x 2", Very Late.

SAND BLASTING EQUIPMENT

1—**AMERICAN WHEELABRATOR** Tumblast, 36 x 42, with Skip Hoist & Shot Return, Serial No. A- 37913.
1—**AMERICAN WHEELABRATOR** Multi-Table Blast Machine, 8-27" Tables, with Shot Return and Dust Collector, Serial No. A-44791, Model BM 66900.
1—**NEW HAVEN** Air Blast Barrel 48" x 42", with Motor and Drive, 1942 unit.

MELTING FURNACES

5—**FISCHER,** #400 Crucible, type BBI mechanical tilting, with motors, blowers, new crucible, and bricking, gas or oil fired. New in 1949.
3—**FISCHER** Model MNP Tilting Furnaces, size 2400, complete with New Pot, blowers, and electrical tilting mechanism.
1—**FISCHER** #225 Crucible, type BBI, mechanical tilting, w/motors, blowers, etc., chanical tilting, w/motors, blowers, etc.
1—**STROMAN** #600, Model "U" Tilting Furnace, 3 H.P. motor and blower, gas fired, with extra shell. New in 1949.

AAA MACHINERY & EQUIPMENT CO.

15539 SARANAC ROAD *Members of American Foundrymen's Society* **CLEVELAND 10, OHIO**

FOR SALE

MOLDING MACHINES
1—Plain jolt machine, 60" x 72" table, 16" cylinder.
1—#276 PJ Osborn jolt squeezer.
2—No. 275 Osborn jolt squeezers.
2—Deuscher Stationary jolt squeeze.
2—SPO #611B Stationary Oscillating Jolt Squeeze Strippers.
1—#610 Johnston & Jennings Air Jolt Rollover Draw Portable 24 x 30 table.
1—Tabor 36 x 50 table Air Jolt Rollover Draw, 3000# capacity.
1—Tabor Pedestal Core Rollover Hand Ram Rollover Draw 14 x 20 table 8" draw.
BLOWERS FOR CUPOLAS AND FURNACES
2—15 HP Spencer-Turbine 2250 CFM at 16 oz.
2—#7½ Roots rotary blowers—27 x 81—14000 CFM.
1—Connersville rotary blower 22 x 66 45 cu. ft. per revolution 9000 CFM.
Maxon-Premix Blowers for Gas ¼ to 1 HP.
2—5 HP 20-oz. Spencer Turbine Blowers.
2—2 HP 20-oz. Spencer Turbine Blowers.
METAL MELTING EQUIPMENT
1—1000# open flame brass melting furnaces, gas fired.
1—MNP Fisher Tilting Al. Furnace 600# cap. gas fired.
1—550# Reda Furnace, nonferrous or iron—oil or gas.
1—Hausfeld Stationary Brass, oil or gas burner, 200# cap.
1—Hausfeld Tilting crucible, gas, 250# Al Cap.
1—Hausfeld 2000# aluminum capacity furnace, barrel type, open flame, oil fired.
New 32" to 41" dia. shell cupolas made to order.
New 1000 lb. aluminum cap. tilting crucible furnaces to specifications.
MISCELLANEOUS
1—Ruemelin cabinet style sand blast room, 7' x 7' x 5' with pres. generator.
1—15 HP Gardner Denver air cooled compressor unit.
1—9 x 8 Ingersoll-Rand compressor, 173 CFM, 100 lbs. pressure, 25 HP.
1—Stoney crane type shakeout.
1—NC-4 Royer sand separator.
1—#1 Demmler core blower.
2—#16 Roto-clone units complete.
1—McLeod Small Sand Blast Barrel 24 x 24.
1—30 x 48 tumbling mill.
1—36 x 48 tumbling mill.
Complete stock of rebuilt mill and dust exhaust blowers.

CLIFTON MACHINERY COMPANY
1023 W. SIXTH ST. CINCINNATI 3, OHIO

FOR SALE

Like new #2½ Whiting Cupola, accessories, and vertical side dump skip hoist charger. Location Central Illinois. Immediate delivery.

BOX 226
FOUNDRY CLEVELAND 13, OHIO

SAVE MONEY ON YOUR PNEUMATIC TOOLS

High quality repair and rebuilding service—fast and economical. Send us your next pneumatic tool as a trial. Your money refunded if not satisfied, estimates furnished.

"WE WELCOME RUSH JOBS"

CENTRAL PNEUMATIC SERVICE CO.
512 LINDEN AVE.
DAYTON 3, OHIO
PHONE: MADISON 2701

FOR SALE

TURBO BLOWERS WITH MOTORS

CFM	PRESS.	MAKE	CFM	PRESS.	MAKE
4500	16 oz.	G.E.	500	10 oz.	No.Am.
3500	40 oz.	Spencer	400	16 oz.	Spencer
2800	1 oz.	Spencer	400	4.3 oz.	Spencer
2700	16 oz.	Spencer	340	20 oz.	A-B
2500	7 oz.	Sturt.	320	12 oz.	Spencer
2000	2½ oz.	Spencer	225	16 oz.	Spencer
2000	1 oz.	Spencer	180	15 oz.	Spencer
1300	16 oz.	Spencer	110	16 oz.	Spencer
1150	20 oz.	No.Am.	9000	6" SP	Northern
675	16 oz.	No.Am.	2344	2" SP	Clarage
660	20 oz.	A-B	1100	4½" SP	Bayley

THE MOTOR REPAIR & MFG. CO.
1552 HAMILTON AVE.
CLEVELAND 14, OHIO

FOR SALE

Davenport type B rollover molding machine, table size 28" x 40". Address: JARDINE BRONZE FOUNDRY, INC., P. O. BOX 129, BALDWINSVILLE, NEW YORK.

NEW DEADLINE FOR CLASSIFIED SECTION

RESERVATIONS FOR SPACE MUST BE MADE NO LATER THAN THE

10TH

OF THE MONTH.

Space cannot be guaranteed for advertisements received after this date.

UNIVERSAL

Partial Listing of America's LARGEST STOCK of GUARANTEED EQUIPMENT

FURNACES

1—350# **DETROIT** Arc Rocker
4—Large **HEAT TREAT** Furnaces
ARC MELTING FURNACES, 60# to 15 tons
3—**AJAX-TAMA-WYATT** 333 KW for Alum.

1,000 LB. MOORE SIZE S LECTROMELT—COMPLETE

5—**HAUSFELD TILTING,** various cap.
2—**FISHER TILTING,** 225 and 400# crucibles
5—**MONARCH** Barrel Type Tilting
1—**AJAX** 50 KW, 3000 cyc. MG
2—**AJAX** 35 KW high frequency, Arc melting

GUARANTEED EQUIPMENT

2—**WHITING** #8 Cupolas
1—**B & P SPEEDMULLOR,** #60 with **SKIP**
1—**SIMPSON MULLER,** #3 with **SKIP**
2—**CLEARFIELD MIXERS,** #610 and #920
1—**WHEELABRATOR** 27 x 36" with **SKIP HOIST** and Dust Collector, Excellent Cond.
1—**CHAMPION CORE BLOWER,** CB 400
1—**TROPENAS STEEL CONVERTER,** 2 Ton Side Blow, Complete with Blower

B & P STATIONARY SAND SLINGER 19" HEAD
B & P MOTIVE SAND SLINGER 19" HEAD

2—**HOUGH PAYLOADERS** 1,000 lb. cap.
1—**RUEMELIN** Blast Cleaning Cabinet
4—**AMERICAN SAND CUTTERS,** All sizes
1—**HEWITT-ROBINS** Apron Type Conveyor
2—**SIMPLICITY SHAKE-OUTS,** 4' x 8'
9—**CORE OVENS,** gas & electric, all types
NUMBER OF MAGNETIC SEPARATORS
2—**BELL** Power Wheelbarrows, gas engines
1—**WHITING SKIP CHARGER** with Loader and 2,000 lb. **KRON** Scale
1—**WHITING #8A KATHABAR,** Cupola Hot Blast
10—**GRINDERS,** double end, 5 to 20 HP
1—**HOWE** electric **WEIGHOGRAPH** Scale
2,000 FT. Foundry Type **ROLLER CONVEYOR**
1—**LINK BELT REVIVIFIER**
1—40 HP Sullivan **AIR COMPRESSOR**
9—**SAND BELT CONVEYORS** 2—**ELEVATORS**
CENTRIFUGAL BLOWERS, 1 to 85 HP
1—**DEWALT ABRASIVE CUT-OFF,** 10 HP
ROYERS & SCREENERATORS, All Sizes

MOLDING MACHINES

1—**JOHNSTON & JENNINGS** 610 Rollover
2—**JOHNSTON & JENNINGS** #2 Jolt Squeeze Strippers
4—**OSBORN** #710 Jolt Strippers
1—**OSBORN** 444 Jolt Rollover
1—**DAVENPORT** 28A Rollover

12 SPO 110J JOLT SQUEEZERS

4—**HERMAN ROLLOVERS,** 60 x 80, 40 x 60, 144 x 96

Over 50 others: **MILWAUKEE, INTERNATIONAL, TABOR,** All types and sizes, rebuilt and guaranteed

COMPLETE STOCK OF TESTING MACHINES, LAB EQUIPMENT, CORE BLOWERS, LADLES AND OVER 250 TONS OF STEEL FLASKS

UNIVERSAL

MACHINERY AND EQUIPMENT CO.
320 E. BROAD ST.
SHILLINGTON, READING, PENNSYLVANIA
PHONE: READING 7-1321

USED FOUNDRY EQUIPMENT FOR SALE

YOU WILL FIND WE HAVE HUNDREDS OF GOOD, USED FOUNDRY MACHINES ALL GUARANTEED

OUR GUARANTEE

Our guarantee is, if you are not satisfied with our equipment, you may return same for a full refund.

THE EUCLID FOUNDRY & MACHINE EQUIPMENT CO.

We buy and sell one piece of equipment, or complete foundries.

14919 SARANAC RD. **CLEVELAND, OHIO**

GLenville 1-1222, 1-1538

FOR SALE

Soil pipe equipment, to make 2" and 4" pipe. 100 shell fitting patterns, snap flasks and binders, 2", 3" and 4" core machine etc. at salvage price 5c per pound. Address: HERBERT J. BROWN, 2008 PORTLAND AVENUE, SHREVEPORT, LA.

FOR SALE

1—Whiting #3½ Cupola, 51" O.D. shell lines down to 36" I.D. Complete with blower and motor. In good condition. Price $1,500.00 f.o.b. Alpena, Michigan. Address THUNDER BAY MFG. CORPORATION, P.O. BOX 317, ALPENA, MICHIGAN.

FOR SALE

Two Modern Equipment spark arrestors for 84" cupola. Never used. Address: **ALBION MALLEABLE IRON COMPANY, ALBION, MICHIGAN.**

TRUSCON STEEL SHOP BOXES

Fifty, excellent condition, 30" W., 24" L., 24" D., 12 ga. steel, corrugated, ⅜" short crane lugs. Entire lot or in units of ten, f.o.b. our plant. $12.00 each. Address: BAIER & ACKERMAN, NORTHVALE, NEW JERSEY.

SMALL GRAY IRON CASTINGS FOR SALE

Castings up to 300 lbs. Write or Phone: OREGON CASTINGS COMPANY, LITITZ, PENNSYLVANIA, PHONE: 6-2462.

FURNACES FOR SALE

Ten used heat treating furnaces and two 7-ton gantry cranes. Good condition, priced to sell. Address: BAER STEEL PRODUCTS, INC., BOX 1428, BOISE, IDAHO.

FOR SALE

Cupola Blower. 1 Spencer Turbine Co. Turbo-Compressor 9000 C.F.M. at 24 ounces pressure. Direct motor drive. Westinghouse Electric and Manufacturing Co. 100 H.P. ball bearing induction motor, 1750 R.P.M. 220 volts, 3 phase, 60 cycles, first class condition. Price $3,000.00. Address: FERRO MACHINE & FOUNDRY, INC., 3155 EAST 66th STREET, CLEVELAND 27, OHIO.

CRANE SCALE

Guaranteed, hydraulic crane scale, like new. 13,000 lb. capacity, height 26", weight 95 lb. $375.00. Address: D & H FOUNDRY, BOX 6064, AUSTIN, TEXAS.

FOR SALE

Osborn Molding Machine Jolt Rollover Pattern Draw, pit type pneumatic drive, draw flask 64", Model 405-1	$1800.00
26—Osborn Molding Machines, Jolt Rollover, Table 18" x 24", 8½" draw, No. 2047-4	350.00
25—Tabor Molding Machines, 10" squeeze	125.00
American Wheelabrator Table #2, with dust collector, complete	3000.00
Beardsley & Piper #30 Speed Muller with skip hoist	2250.00
Beardsley & Piper #40 Speed Muller	1700.00
24—Osborn 110J Squeeze Jolt Cantilever type	225.00
Jeffrey Sanditioner, capacity 10-15 tons per hour	400.00
2—Osborn Molding Machines, Table 30" x 22", power rollover	175.00
Tabor Molding Machine, table 24" power rollover	150.00
Royer Sanditioner Junior Type	175.00
Beardsley & Piper Screenarator, type M	475.00
American Dustube, No. 185, capacity 12500 C.F.M., of cloth area	800.00
Sand Riddles	65.00
Adams Hand Squeeze Molding Machines, 34"	65.00

M. ELSTEIN
370 EAST HOUSTON ST.
NEW YORK 2, NEW YORK

BUY—TRADE—SELL

48 x 42 Wheelabrator overhauled.
27 x 26 Wheelabrator A-1 Shape.
1½ Cu. Ft. Rocker Barrell Pangborn.
Size 65 American Collector 2000 C.F.M. Cap.
Pangborn CK-223 Collector 3000 C.F.M. Cap.
Roto Clone Type D, Size 8 Collector 2000 C.F.M. Cap.
Sly EE Collector, 14500 C.F.M. Capacity.
Also EN. 2 Pangborn Hand Cabinets, Vapor Blast Cabinets Pressure Tanks.

IF INTERESTED IN TRADING ANY OF THE ABOVE FOR YOUR PRESENT EQUIPMENT PLEASE CALL OR WRITE:

DIAMOND SAND BLAST INC.
5654 E. Jefferson
Detroit 9, Michigan
Vinewood 3-6750

Another First For AAA Machinery & Equipment Co.

We have purchased the FOUNDRY EQUIPMENT from The International Harvester Co. in Chicago due to the discontinuance of their Tractor Works Foundry.

3—B & P SANDSLINGERS

2—TRACTOR TYPE 6′ arms, with 4′ impeller head extensions, 4″ wide liner and cups, 19″ head, 15 HP motor on impeller, 10 HP motor for propulsion on tracks. Each machine equipped with additional impeller unit, 25 HP motor, 5″ liner and cups. 220/440 volts.

1—STATIONARY TYPE Model DB, 16″ head, 4″ tip, 6″ arm, 4′ impeller head extension, motor two speed, dual 10-15 HP, 220/440 volts.

10—SLY TUMBLING MILLS

1—45″ x 72″ direct drive, round type.
7—36″ x 60″ direct drive, round type.
2—45″ x 84″ direct drive square type.

These machines were recently rebuilt by The Sly Mfg. Co. and never put back into operation. "LIKE NEW CONDITION". All equipped with direct motor drive.

9—B & P SCREENARATORS

3—Model "S", pneumatic tires.
3—Model "M", pneumatic tires.
3—Model "L", pneumatic tires.

B & P NITE GANG

Sand preparator, Serial No. 1-491, excellent condition. New in 1949.

B & P PREPARATOR

Portable model 70, with magnetic separator, 90 cu. ft. hopper, aerator and gyrating screen. 60 tons per hour.

DIETERT SAND TEST EQUIPMENT

Consisting of permeability meter, sand strength machine, sand rammer, core dryer, scales, etc.

B & P SPEEDMULLER

10 cubic ft. complete with 50 HP enclosed motor and electrical, new liner and wheels, excellent condition.

5—SIMPSON SAND MULLERS

#3, enclosed gearing, style "C", capacity 3000 lbs. 8′ pan diameter, new in 1942 and 1946. Serial Nos. in 58,000's.

DIELECTRIC CORE OVEN

Manufactured by Induction Heating Corp., Model #M-800A, 600 lbs. per hr. 8″ max, hgt. of core, 24″ wide, 220 volts, 15 KVA, 100 amps. Water cooled transformer, 60 cycle. 3 phase, belt 24″ x 52″ long. Machine had only 300 hrs. use. New in 1950.

CUPOLA BLOWER

Manufactured by G.E. centrifugal blower, type FS 3670-9400, serial No. 27006, motor 100 HP, 3600 RPM, Model 11A585.

FARQUHAR TROUGH CONVEYOR

Portable 18″ x 40′, model "343" complete with motor and electrical.

FARQUHAR UNDERCAR UNLOADER

Portable 18″ x 19′ complete with motor and electrical.

JEFFREY BUCKET ELEVATOR

106′ belt, 13″ wide, 50′ centers of drive pulleys, buckets 12″ x 8″ x 11¾″ continuous type.

MODERN POURING DEVICES

6—Models "F" and "FG" complete with 500 lb. ladles.

SWING GRINDER

Mummert Dixon 15 HP, 24″ x 3″ wheel, 2 speed, 220/440 volts.

AAA MACHINERY & EQUIPMENT CO.

15539 SARANAC ROAD *Members of American Foundrymen's Society* **CLEVELAND 10, OHIO**

ALL EQUIPMENT SOLD WITH A FULL MONEY BACK GUARANTEE

FOR SALE

AIR COMPRESSORS

Ingersoll Rand Type 10—14 x 9 x 12, 2 stage, 75 HP, 3/60/220/1200 rpm synchronous motor, 350 CFM at 100#.
5 x 5 Ingersoll Rand 10 HP motor.

BLOWERS

Spencer Turbo Blower, 2250 CFM at 16 oz. 15 HP 3/60/220 totally enclosed motor. New 1947.
Ingersoll Rand Motor Blower Type FS. Single Stage 4000 CFM @ 3.75 PSI, 100 HP, 220 V, G.E. Induction Motor.
Buffalo 7E Direct Connected Blower, 50 HP Westinghouse motor, 3/60/220-440 V, 3535 rpm, 28" wheel, 3500-4000 CFM at 32 oz. Flanged onutlet.
Spencer Turbo Blower. New 1949. 3500 cfm, 28 oz. with 40 HP 220-440 motor and Foxboro controls.

CONVERTER

100 KW Rotary Westinghouse 220 V 60 cycle primary 250 V DC, complete with controller and panel.

CORE BLOWER

Champion CB400

CORE OVENS

3—Section Foundry Equipment Co. Gas fired, 5 drawers per section.
4—Section Foundry Equipment Co. Gas fired, 5 drawers per section.

CORE ROD STRAIGHTENERS

1—American Core Rod Straightener.

CRANES

5 Ton P & H Overhead Elec. Traveling Crane, 30'6" span, 15' lift (can be increased) 3 motor, 220 V A.C. New 1946.
10 Ton Northern Overhead Elec. Traveling Crane, double girder, fish belly, 3 motors, 230 V D.C., 54'7½" wide C to C of wheels can be cut down to fit smaller size.

CRUSHERS—PULVERIZERS

2—Stedman 15" x 12" Type A. One with 10 HP 220-440 V motor. One without motor.

FIRE EXTINGUISHERS

St. Regis Model 181 Dry Powder for magnesium fires.
Buffalo 50 gal. soda-acid cart type.

FORK LIFTS

Baker 6000# Gasoline Fork Lift Trucks, KMH60, 120" lift, 88" collapsed height, 42" forks, solid tires. Rebuilt-Guaranteed.
Ross Fork Lift Truck, 19 HT, high lift, 6000# capacity, 14' lift, 48" forks. Pneumatic tires. Rebuilt-Guaranteed.

GRINDERS, DISC

Besley 20S Double End 26" x 2¾" wheel with 2 compound tables, V belt drive, 15 HP, 220-440 totally enclosed motor, magnetic starter controls.
2—U. S. Model 80 Double End 2-18" dia. wheels, 7½ HP motor, 2 swinging tables 8" x 14"—1 with hand lever feed.

GRINDERS, SNAGGING

McCabe 2" x 24" wheels, 48" between wheels, 3/60/440 V.
Ranson 8B Double End 2" x 20" wheels, 220 V motor, p/b control.
1—Hammond type 20 WR2—3" x 24" wheel, double end grinder, single speed, 20 HP Louis Allis Squirrel Cage, 220-440 V—1760 rpm motor.
2—Norton Type D, 3" x 24" wheel, 66" between centers, flat belt drive.
1—U. S. DE, 7½ HP adjustable speed.
2—U. S. DE, 20 HP adjustable speed.
1—U. S. DE, Model 65, 3" x 24" wheels, variable speed, 20 HP motor.
2—U. S. Model 64 Snag Grinders 3 x 24" wheels. Late.
2—U. S. Model 65 Snag Grinders 3 x 24" wheels. Late.
1—Fox #5 Single Wheel Snag Grinder.

GRINDERS, SWING

2—Fox 10 HP 3/60/220-440 V, Swing Frame.
U. S. 15 HP, 3/60/440 V Swing Frame, 2 speed.
Fox 15 HP Swing Frame, 2 speed.
Marschke 20 HP, 2 speed.

HOISTS

500# American LoHed.
1000# Cleveland 220/440 V.
1000# Detroit 220/440 V.
5—1000# P & H Hevi Duty with trolley.
2—2000# P & H Hevi Duty with trolley.
2000# Detroit Electric.
2000# American LoHed.
11—4000# P & H Hevi Duty with trolley.
2—4000# P & H Hevi Duty with trolley and powered drive unit for moving hot metal.
2—5 Ton Air Hoists with motor driven trolleys.

LADLES

1 Ton Enclosed Gear Crane Ladle truck type 4 wheel car for 18" gage track, Whiting Junior.
1—20½" Top Whiting Enclosed Gear Ladle.
3—1500# Modern Cylindrical covered ladles, 28" dia.
2—Whiting 40" x 40" enclosed gear outside teapot spout ladles.
1—Whiting 44" x 44" Bottom Pour Ladle, 8000# in steel.

MOLDING MACHINES

Champion Pin Lift Pushoff, 38" x 40" 12" draw.
1—Champion Hand ram, hand clamp, hand rollovers 26" x 14" table.
1—Champion Hand Ram, Hand rollover, Hand draw core machines, 15 x 15 bed.
3—Davenport Portable Jolt Rollover Pattern Draw 20" x 24" tables, open end, 8" draw.
1—International Type G 24 x 10 Jolt Rollover, foot draw, 22 x 30 table, 10" draw.
1—Herman Molding Machine Jolt Rollover Pattern Draw, 20 x 30.
1—Herman Molding Machine Jolt Rollover Pattern Draw, 20 x 36.
1—International Type G 30 x 12 Jolt Rollover Foot Draw, 28" x 36" table, 12" draw.
1—International Type G 30" x 30" table, 9" draw, Portable.
2—International Type G 18" x 56" table, 8" draw. Portable.
1—International Type F Jolt Rollover 27 x 12, 12" draw, 35" x 26" table.
1—International Jolt Rollover Pattern 10" Draw, 22" x 30" plate, 6" jolt cylinder.
1—International Plain Jolt Molding Machine 48" x 60" table, no pit required.
1—Herman Jolt Rollover Pattern draw, 40" x 84" table, slotted nickel alloy table over regular table to accommodate various sized flasks, air clamp, new 1946. Used very little.
1—Herman 20" x 30" rollover pattern draw, 750# series. Air clamp.
2—Herman 20" x 24" Jolt Rollover Pattern Draw, 750# series. Air clamp.
1—Herman 4000# Series High Speed Rollover 30" x 60" with 32" x 48" bumper, 13" cylinder pattern device.
2—Milwaukee Arm Type Jolt Squeeze Strippers, 1500# capacity, Model 163-50 Serial 13104-5, 15" x 24" table, 16" x open end, pattern size. Late type.
1—Osborn 76J Portable Jolt Squeeze Molding Machine 12" cylinder.
3—Osborn Jolt Squeeze Molding Machines, 275J, 16 x 20 table, tilt back head.
2—Osborn 405 Jolt Rollover 40" x 70", 2000# capacity, 20" x 60" jolt table and 4 wheel receiving car.
1—Osborn Portable Jolt Rollover Pattern draw, 900# capacity. Model 601-13. 30" x 24" flask size, 10" draw.
1—Tabor 1000# Rollover, 30" x 60" table.

MULLERS AND MIXERS

1—Simpson #1 Style K Muller with Bucket Loader, 4 cu. ft. size.
Simpson #2 Motor on base, bucket loader.
Simpson #3 Motor on base, bucket loader.
Simpson #3 Type H open gear type.
Simpson #3 Open Gear Type, $1000.00.
American Model M Sand Cutter, 70" blades.
Kwick Mix Paddle Type.
Royer NDP 47 14" Belt, 4 rubber tires.

PREPARATOR

B & P #70 Preparator. Only used 3 months.

ROTOBLAST

Pangborn, table with 3-8" rotating work tables, 3 position loading, cleaning and touch-up designed for work similar in size to aircraft cylinders. Like New condition.

SHAKEOUTS

1—3' x 5' Link Belt.
2—4' x 6' Simplicity.

SPEED REDUCERS

Cleveland 40S-R1, 36 to 1, 20.5 HP.
Falk Motoreducers 7½ HP.
U. S. Syncrogear Motors 7½ HP.
U. S. Syncrogear Motors 5 HP.

TUMBLING BARRELS

Whiting 30" x 48".

WIRE STRAIGHTENERS

2—Climax 1 HP motor.

ACME EQUIPMENT CO., INC.

WE WILL BUY FOR CASH A SINGLE PIECE OF EQUIPMENT OR YOUR ENTIRE FOUNDRY
126 South Clinton Street Phone: Andover 3-3430 Chicago 6, Illinois

ELECTRIC MELTING FURNACES

LECTROMELT TOP CHARGE 2 ton type CQT. 2000 KW Allis Chalmers transformer 12000 volt primary. Late type unit complete in place Chicago.

LECTROMELT 1 Ton, Side Charge. 800 KW transformer 12000 Volt primary. Late type unit. In place Chicago, complete.

LECTROMELT 500# Type T Side Charge. 300-375 KVA Transformer GE Circuit breaker. Moore controls 2300 volt primary current. Late type, now in our warehouse Chicago.

DETROIT ELECTRIC, 1500# capacity, 13,200 primary voltage. Kuhlman transformers. Complete with controls.

2-BAILEY (Electric Furnace Co.) 75 KW Electric Arc Type side electrode tilting furnaces and transformers.

DETROIT ELECTRIC 350#, Type LFA with Kuhlman transformers and oil circuit breaker. 13,200 primary voltage.

DETROIT ELECTRIC with 350# and 1000# tapered shells, 2300V Kuhlman Transformer. Complete with panelboard and bus bars.

ACME EQUIPMENT CO., INC.

126 South Clinton Street
Chicago 6, Illinois
Andover 3-3430

Foundry Liquidation

July 1st we start the liquidation of Surplus Machinery and equipment of the Steel Foundry formerly property of Western Foundry Co.—This equipment, a complete Electric Furnace Steel Job Shop, is being offered with the 2 Gray Iron Foundries offered last month.

SEND FOR OUR COMPLETE LIST

3—Sand Slingers, tractor type

5—Sand Mullers B & P 30-40-50's—60's and Simpsons 2F

3—American Wheelabrator Tumblasts 36 x 42 to 48 x 48

2—Air Compressors 175 HP Synchronous Ingersoll Rand—5 x 5 10 HP Pennsylvania

15—Bridge Cranes Cleveland and Whiting

30—Hoists Ingersoll Rand 1000 to 4000# Budget, and P & H 3 ton Electric

1—Core Oven 4—4 x 5 car capacity gas fired electric upraising doors

1—Whiting Monorail type charger

4—Hough Payloaders

6—Lift trucks, Ross, Clark, Mobilifts

6—Blowers from 10 HP up to GE 7500 CFM Cupola blower airway controls

4—Core Blowers, Redford, International Champion 10 hp to 20 hp

10—Swing Frame Grinders, Fox and Marschkes

25—Ladles covered cylindrical geared, teapot spout inside and outside, top pour, bottom pour

10—B & P Champion Pin Lifts Push Offs 29" pin centers 8" and 10" lifts

20—Grinders, all types, Besley 214 Disc Gardner Flat Disc 54", Snag Grinders U. S. 65's—20 HP 30 x 3 x 12 wheels, Hisey Wolf 30N3—15 HP motors and many other, some use smaller wheel sizes

1—Milwaukee 3 H Milling Machine with Rusnok Universal head

60—Molding Machines, Spo 110's 113—2140, 413D 506's—508's Osborn 275J, 276J, 714's 721's portable and stationary International PK16, PK20, also Jolt Squeeze Pin Lifts, hand rollovers

2—General Electric 5 ton Car type Electric Annealing Furnaces 250 KW 1 unit low temperature 1200°-1500° other 1500 to 1800° with vented cooling hood

3—Yard Cranes—5 ton Krane Kar, 7½ ton Hughes Keenan, and 1 yard P & H 255A—40' Boom with generator and magnet

1—Lectromelt Top Charge 2 ton Type CQT 2000 KW Allis Chalmers transformers 12000 volt primary Late type unit

Thousands of Hines flasks and Jackets, tons of Metal flasks, core plates, air tools.

WE MUST CLEAR THE PROPERTY AT ONCE!

Here is a real opportunity to get GOOD EQUIPMENT at a FRACTION OF NEW COST.

Agent on premises at 3634 S. Kedzie weekdays Monday thru Friday 8 to 5, Saturdays and Sundays by appointment. Phone at foundry—Cliffside 4-1941

ACME EQUIPMENT CO., INC.

WE WILL BUY FOR CASH A SINGLE PIECE OF EQUIPMENT OR YOUR ENTIRE FOUNDRY

126 South Clinton Street **Phone: Andover 3-3430** **Chicago 6, Illinois**

For Permanent Mold Castings

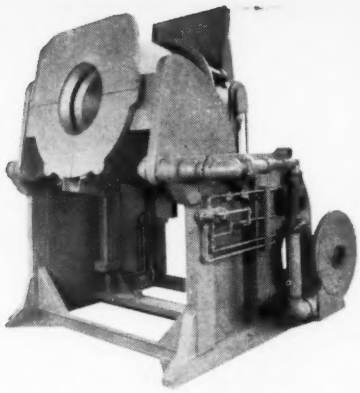
A complete line of

LINDBERG FISHER

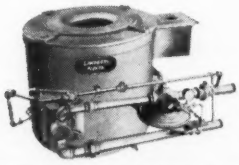
ALUMINUM MELTING and HOLDING FURNACES

Lindberg-Fisher manufactures all types of Aluminum Melting and Holding Furnaces for permanent mold application—Gas-Oil-Electric resistance.

Lindberg-Fisher engineers can intelligently recommend the type of furnace to best suit your needs and conditions.

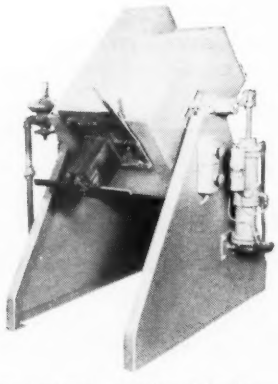


Lindberg-Fisher type HNP Hydraulic Nose-Pour Tilting Crucible Furnace. Pouring lip is located in the axis of tilting providing a constant pouring arc regardless of degree of furnace tilt. Capacities up to 1000 lbs. of aluminum. Oil or gas fired. Described in Bulletin 57-A.



Lindberg-Fisher type ADC Aluminum Melting and Holding Furnace. Capacities up to 1000 lbs. of aluminum. Oil or gas fired. Described in Bulletin 301.

Lindberg-Fisher Electric Resistance Aluminum Melting and Holding Furnace equipped with heavy duty resistance elements which give uniform distribution of heat, insuring long element and pot life. Capacities up to 1000 lbs. of aluminum.



Lindberg-Wessel Casting Machine produces quality aluminum castings on a semi-automatic basis using either graphite or steel molds which are attached to the machine. Described in Bulletin LW.

Melting specialists for 25 years
Sales and service offices in principal cities

LINDBERG FISHER **MELTING FURNACES**

A Division of Lindberg Engineering Company, 2453 West Hubbard Street • Chicago 12 • Illinois

ADVERTISING INDEX

Abrasive Shot & Grit Co., Inc. 235
Acheson Colloids Co. 181
Acme Foundry Co. 257
Adams Co., The 27
Ajax Electric Co., Inc. 18
Ajax Electric Furnace Corp. 18
Ajax Electrothermic Corp. 18
Ajax Engineering Corp. 18
Alabama By-Products Corp. 249
Allied Chemical & Dye Corp., Semet-Solvay Div. 13
Allis-Chalmers 11, 20
Aluminum Smelters Research Institute ... 167
Alvey-Ferguson Co., The, of Cincinnati .. 248
American Brake Shoe Co., Electro-Alloys Div. 40
American Chain & Cable, American Chain Div. 227
American Chain Div., American Chain & Cable 227
American Clay Forming Co., The 252
American Gum Products Co. 258
American MonoRail Co. 217
American Optical Co., Safety Products Div. 50
American Saw & Mfg. Co. 263
American Smelting & Refining Co. 256
American Steel Abrasives Co., The 263
American Wheelabrator & Equipment Corp. 15, 200
Anderson Pattern, Inc. 242
Archer-Daniels-Midland Co., Foundry Products Div. 4, 5

Babcock & Wilcox Co., The, Refractories Div. 51
Bailey, William M., Co. 251
Bakelite Co., A Div. of Union Carbide & Carbon Corp. 123
Baker-Raulang Co., The 55
Baroid Sales Div., National Lead Co. ... 229
Bartlett, C. O., & Snow Co., The Back Cover
Bay State Crucible Co. 264
Beardsley & Piper Div. of Pettibone Mulliken Corp. 141, 142, 175, 176
Bell, M. A., Co. 222
Belmont Smelting & Refining Works, Inc. 246
Birmingham Committee of 100 44
Buckeye Tools Corp. 12
Buehler, Ltd. 256
Buffalo Pattern Works, Inc. 119

Campbell-Hausfeld Co., The 253
Carborundum Co., The ..... Inside Front Cover, 64, 171, 234
Carl-Mayer Corp., The 58
Carman, Edwin S., Inc. 264
Carrier Conveyor Corp. 173
Centrifugal Casting Machine Co. 257
Chambersburg Engineering Co. 70
Chicago Eye Shield Co. 247
Chicago Wheel & Mfg. Co. 243
Christiansen Corp. 39
City Pattern Foundry & Machine Co. 207
Clark Equipment Co., Construction Machinery Div. 37

Clearfield Machine Co. 21
Cleveland Chaplet & Mfg. Co. 262
Cleveland Crane & Engineering Co., The, Cleveland Tramrail Div. 135
Cleveland Flux Co., The 139
Cleveland Metal Abrasive Co., The 156
Cleveland Tramrail Div., The Cleveland Crane & Engineering Co. 135
Cleveland Vibrator Co., The 241
Combined Supply & Equipment Co., Inc. . 261
Contractors Machinery Co., Inc. 14
Cooper-Bessemer Corp., The 52
Crescent Brass & Pin Co. 223
Crobaugh, Frank L., Co., The 264
Curtis Pneumatic Machinery Div. of Curtis Pneumatic Co. 38

Danko Pattern & Mfg. Co., Inc. 262
Dayton Pneumatic Tool Co. 262
DeBardeleben Coal Corp. 263
Deister Concentrator Co., The 216
Delta Oil Products Co. 48
Delta Power Tool Div., Rockwell Mfg. Co. . 69
Demmler, Wm. & Bros. 23
Detroit Electric Furnace Div., Kuhlman Electric Co. 60, 61
Detroit Hoist & Machine Co. 239
Dow Corning Corp. 182
Durex Refractories Co. 226
Durez Plastics & Chemicals, Inc. 196, 197

Eastern Clay Products Dept., International Minerals & Chemical Corp. 190, 191
Eastman Kodak Co., X-Ray Div. 205
Electric Furnace Co., The 246
Electro-Alloys Div., American Brake Shoe Co. 40
Electro Metallurgical Co., A Div. of Union Carbide & Carbon Corp. 66
Erie Strayer Co. 242

Fanner Mfg. Co., The 53
Federal Foundry Supply Co., The 2, 16, 17, 111
Foundry Equipment Co., The 30
Foundry Supplies Mfg. Co. 68
Fox Grinders, Inc. 228

Continued on Page 276

FOUNDRY

BUSINESS STAFF

GEORGE A. POPE, *Business Manager*
MARY JANE KIMPEL, *Advertising Service*

New York ..... J. F. AHRENS
J. L. OZANNE
Chicago ..... A. W. JOHANSEN
L. R. HETKE
Cleveland ..... A. L. KLINGERMAN
J. K. GILLAM
San Francisco ..... F. J. FULLER
ROBERT W. WALKER CO.
Los Angeles ..... F. J. FULLER
Griffin, Ga. ..... F. J. ALLEN
London ..... VINCENT DELPORT

Market Research and Promotion

DAVID D. GIBBS, *Manager*
JEANNE FRANKLIN
MILDRED CHRISTOPHER

Circulation Department

G. R. EBERSOLE, *Manager*
BETTIE THOMPSON

Classified Advertising Department

DOLORES BRANT, *Manager*

Production Department

RICHARD J. STRNAD, *Manager*

Main Office

Penton Building, Cleveland 13, Ohio
Main 1-8260

Branch Offices

New York, 17 ..... 60 East 42nd St.
Murray Hill 2-2581
Chicago, 11 ..... 520 N. Michigan Ave.
Whitehall 4-1234
Detroit, 2 ..... 6560 Cass Ave.
Trinity 5-3024
Los Angeles, 48 ..... 6262 Commodore Sloat Dr.
Webster 1-6865
Pittsburgh, 19 ..... 2837 Koppers Building
Atlantic 1-3211
San Francisco, 4 ..... 57 Post St.
Sutter 1-5568
Washington, 4 ..... 1123 National Press Building
Executive 6849
London ..... 2 Caxton St.
Westminster, S.W. 1
Griffin, Ga. ..... 331 South 12th St.

Published monthly by

THE PENTON PUBLISHING COMPANY

G. O. HAYS ..... *President and Treasurer*
R. C. JAENKE ..... *Executive Vice President*
F. G. STEINEBACH ..... *Vice Pres., and Secretary*
F. O. RICE ..... *Vice President*
J. P. LIPKA ..... *Asst. Secy. and Asst. Treas.*
Also publisher of STEEL • MACHINE DESIGN
NEW EQUIPMENT DIGEST • AUTOMATION

Subscription: United States, possessions and Canada, one year $5; two years $8. Other foreign countries, one year, $10. Single copies 75 cents. Copies published three months or more previous to date of current issue, $1.00.

Member: National Business Publications, Inc.; and Society of Business Magazine Editors. Copyright 1954 by THE PENTON PUBLISHING CO.

Entered as second class matter at postoffice at Cleveland, Ohio, under act of March 3, 1879.

FOUNDRY is indexed regularly by Engineering Index Inc.
29 West 39th St., New York 18.

BPA NBP

ADVERTISING INDEX

Foxboro Co., The 159
Fremont Flask Co., The 25
Frontier Bronze Corp. 264

General Electric Co. 41
Girdler Co., The, A Div. of National Cylinder Gas Co. 121
Gordon, Claud S., Co. 237
Great Western Mfg. Co. 255
Green, A. P., Fire Brick Co. 75

Hardy Sand Co. 245
Herman Pneumatic Machine Co. 162, 163
Hewitt-Robins, Inc. 6, 7, 8, 9
Hickman, Williams & Co., Inc. 210, 259
Hines Flask Co., The 56, 57
Holcroft & Co. 145
Hough, Frank G., Co., The 169

Imperial Belting Co. 10
Industrial Motor Service 256
International Minerals & Chemical Corp., Eastern Clay Products Dept. 190, 191
International Molding Machine Co. 115

Jaeger Machine Co., The 22
Johns-Manville 215, 236
Johnston Mfg. Co. 234

Kaiser Aluminum & Chemical Sales, Inc. 42
Keokuk Electro-Metal Co. 36
Kuhlman Electric Co., Detroit Electric Furnace Div. 60, 61
Kwik-Mix Co. 206

Lanly Co., The 136
Latrobe Steel Co. 241
Lindberg Engineering Co., Lindberg-Fisher Div. 274
Lindberg-Fisher, A Div. of Lindberg Engineering Co. 274
Link-Belt Co. 63
Lithium Corp. of America 243
Logan Co. 133

Manning, Maxwell & Moore, Inc. 165
Master Pneumatic Tool Co., Inc., The 258
May-Fran Engineering, Inc. 65
Mechanical Handling Systems, Inc. 117
Metal Blast, Inc. 149
Michigan Oven Co. 250
Miller Fluid Power Co. 24
Milwaukee Chaplet & Mfg. Co. 26
Minnesota Mining & Mfg. Co. 219
Muller Machinery Co., Inc. 265
Modern Equipment Co. 278
Monsanto Chemical Co., Plastics Div. 230
Murphy, Jas. A., & Co., Inc. 266

National Carbon Co., A Div. of Union Carbide & Carbon Corp. 179
National Cylinder Gas Co., The Girdler Co. Div. 121
National Engineering Co. 46, 47
National Lead Co., Baroid Sales Div. 229
National Lead Co., Titanium Alloy Mfg. Div. 62
National Metal Abrasive Co. 259
Neff & Fry Co., The 224
Newaygo Engineering Co. 72, 73
Newcomb-Detroit 265
Niagara Falls Smelting & Refining Div. 186
Nicholls, Wm. H., Co., Inc. 74
Norton Co. 28, 29, 146

Ohio Crankshaft Co., The 151
Ohio Electric Mfg. Co., The 260
Oliver Machinery Co. 259
Orefraction, Inc. 45
Osborn Mfg. Co., The 184, 185

Pangborn Corp. 31, 49
Penn Iron Works, Inc. 264
Petersen Oven Co., The, Stroman Furnace & Engineering Co. Div. 71
Pettibone Mulliken Corp., Beardsley & Piper Div. 141, 142, 175, 176
Philadelphia Coke Co. 260
Pickands Mather & Co. 225
Pittsburgh Coke & Chemical Co. 59
Pittsburgh Lectromelt Furnace Corp. 54
Pittsburgh Metals Purifying Co. 188
Porcelain Products, Inc. 265
Prime-Mover Co., The 261
Propellair Div. of Robbins & Myers, Inc. 260

R & J Foundry Co. 257
Radium Chemical Co., Inc. 239
Redford Iron & Equipment Co. 199
Reichold Chemicals, Inc. 233
Remmey, Richard C., Son, Co. 235
Republic Coal & Coke Co. 258
Republic Steel Corp. 67
Robbins & Myers, Inc., Propellair Div. 260
Robeson Process Co. 258
Rock Island Millwork Co., Resinwood Div. 111
Rockwell Mfg. Co., Delta Power Tool Div. 69
Roura Iron Works, Inc. 237
Royer Foundry & Machine Co. 109

Schneible, Claude B., Co. 32
Schramm, Inc. 254
Scientific Cast Products Corp., The 164
Semet-Solvay Div., Allied Chemical & Dye Corp. 13
Sidley, R. W., Inc. 262
Simplicity Engineering Co. 153
Sly, W. W., Mfg. Co., The 244
Smillie, C. M., & Co. 238
Smith Oil & Refining Co. 221
Spencer Turbine Co., The 155
SPO, Inc. 202, 203
Standard Silica Corp. 262
Sterling Wheelbarrow Co. 76, 224
Stevens, Frederic B., Inc. ..... Inside Back Cover
Stroman Furnace & Engineering Co. Div. of The Petersen Oven Co. 71
Swan-Finch Oil Corp. 259

Tabor Mfg. Co., The 19
Technical Operations, Inc. 218
Titanium Alloy Mfg. Div., National Lead Co. 62
Towmotor Corp. 144

Union Carbide & Carbon Corp., Bakelite Co. 123
Union Carbide & Carbon Corp., Electro Metallurgical Co. 66
Union Carbide & Carbon Corp., National Carbon Co. 179
United Oil Mfg. Co. 43
Universal Engineering Co. 160

Wedron Silica Co. 238
Wellman Engineering Co., The 263
Westover Engineers 262, 277
Whitehead Brothers Co. 35
Whiting Corp. 1
Wiegand, Edwin L., Co. 240
Willson Products, Inc. 187
Wilton Tool Mfg. Co., Inc. 186
Woodward Iron Co. 113

Table of Contents, Page 3

Classified Advertisers, 266, 267, 268, 269, 270, 271, 272, 273

Presenting the WESTOVER DISTRIBUTORS

Our distributors are as enthusiastic about WESTOVER products as the manufacturers themselves. The NOMAD FOUNDRY EQUIPMENT DIVISION of the WESTOVER ENGINEERS is proud of the men who represent them, from Eastern Canada to Northern California, and from upper Michigan to Mexico. The eight areas above, enclosed in heavy gray margins, show where our distributors operate. Call any of these district offices if you have any questions or problems that can be solved by foundry engineers. These men can help you. Make a note NOW of the representative in your district, and file the information for future reference.

1. **JOHN B. SKELLY**
   232 Home Ave., Oak Park, Illinois
   Area: N. Ill., E. & S. Wis., Upper Peninsula & N.W. Ind.
2. **KLEIN-FARRIS CO., INC.**
   683 Atlantic Ave., Boston, Mass.
   Area: The Six New England States
3. **TELLER EQUIPMENT CO.**
   Port Murray, N. J.
   Area: Northern N. J. & Eastern N. Y.
4. **CHARLES W. LUEDERS & CO.**
   419 Thomas Ave., Riverton, N. J.
   Area: Southern N. J., Eastern Pa., Md., & Del.
5. **WESLEY A. MINER & ASSOCIATES**
   2414 W. Lawrence Ave., Chicago, Illinois
   Area: Indiana (S. & E.), E. Central Ill. & N. Ky.
6. **INDUSTRIAL & FOUNDRY SUPPLY COMPANY, INC. OF CALIFORNIA**
   1434 Howard Street, San Francisco, California
   Area: Northern California
7. **M. A. BELL CO.**
   217 Lombard Street, St. Louis, Missouri
   Area: Neb., Col., Tex., Ark., Okla., Kan., La., Mo., S. W. Ill., W. Ky., and W. Tenn.
8. **NEWMAN FOUNDRY & SUPPLY LTD.**
   P. O. Box 160, St. Lambert, Montreal, Quebec, Canada
   Area: Quebec and Eastern Canada

NOMAD FOUNDRY EQUIPMENT
WESTOVER ENGINEERS
3110 WEST FOND DU LAC AVENUE • MILWAUKEE 10, WISCONSIN

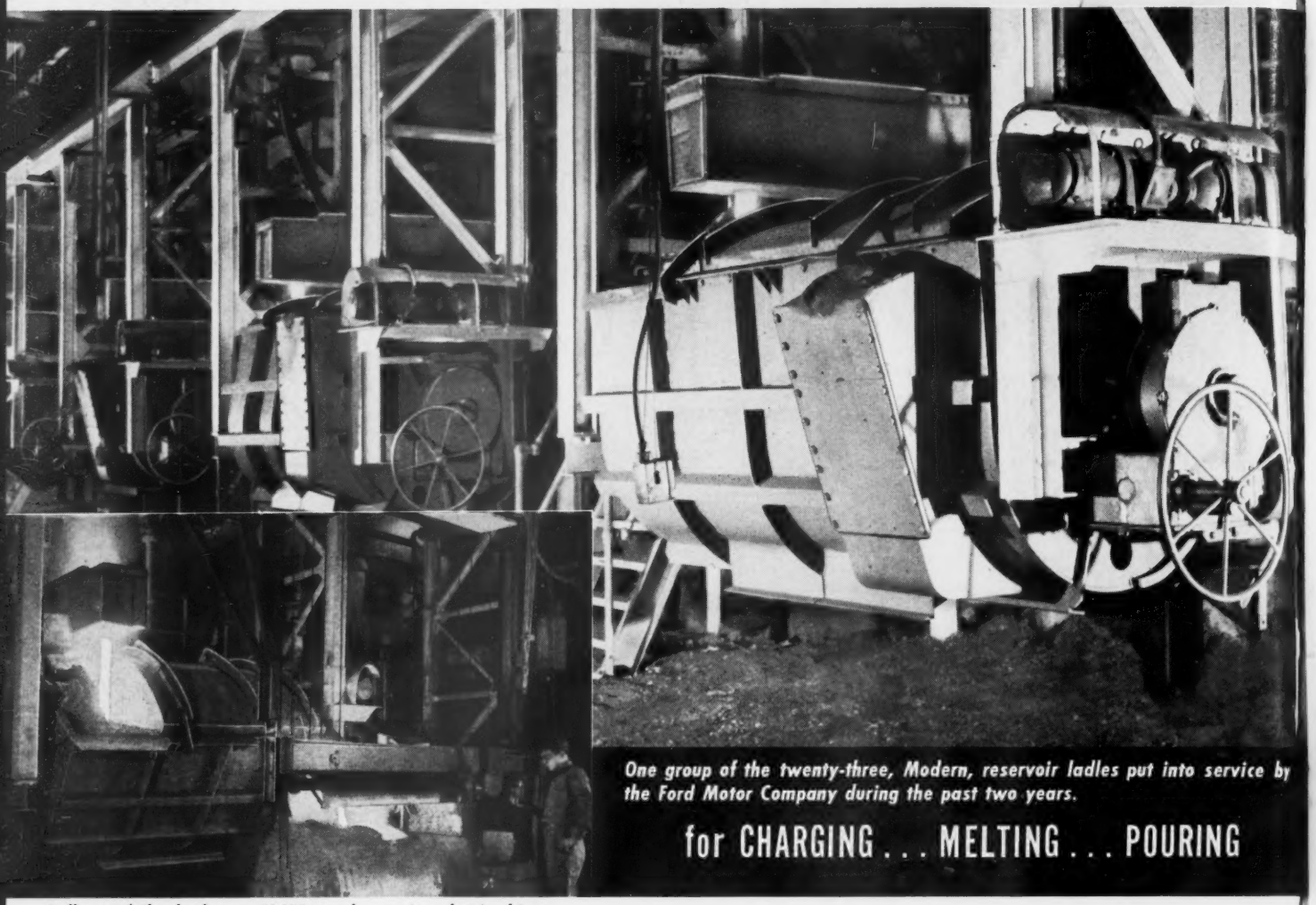
WESTOVER ENGINEERS

NOMAD FOUNDRY EQUIPMENT DIVISION

3110 W. FOND DU LAC AVE. • MILWAUKEE 10, WISCONSIN

1,200,000 Square Feet *IS* a Large Foundry

BUT, large or small here's a TIME TESTED service for you...



One group of the twenty-three, Modern, reservoir ladles put into service by the Ford Motor Company during the past two years.

for CHARGING . . . MELTING . . . POURING

*Ladles at *Cleveland are—16,000 pounds capacity, electric driven and all welded construction. Overhead mounting of these ladles permits maximum accessibility for the metal carriers and ready clean-up around the cupolas. Gas fired pre-heaters are used.*

Whether or not your problem is comparable to Ford's production of 1,400 tons daily, or shaking-out only 100 tons a month in your own foundry, MODERN equipment, counsel and experience are as close to you as your 'phone.

Ladles shown in service here at the new Ford foundry in Cleveland receive all the metal from the cupolas for transfer over hot metal carriers. Each ladle is electrically driven and engineered to operate at 16,000 pounds capacity. Double end-wall construction adds rigidity for trunnions and helps to lengthen bearing life.

In these and other ways in foundries large and small MODERN foundry equipment has been serving well for more than thirty-five years. Whether your problem involves CHARGING . . . MELTING . . . POURING—or the coordination of every movement from scrap yard to shake-out—you will build around TIME TESTED methods when you put all your problems to MODERN engineers . . .

* FORD MOTOR COMPANY
CLEVELAND, OHIO

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION MEMBER FEMA

MODERN EQUIPMENT COMPANY
Port Washington, Wisconsin

MODERN REPRESENTATIVES IN ALL PARTS OF THE WORLD

HEAVY MACHINE TOOL CASTINGS.

PROBLEM: Casting surfaces showed chipping marks. Metal penetration was very bad, and an entire day was needed to clean the castings.

SOLUTION: STEVENS #380 Core and Mold Coating.

RESULTS: Castings for which #380 was used did not show a single chipping mark, saving of six man hours of cleaning room time.

COUNTERWEIGHTS WEIGHING SEVERAL TONS.

PROBLEM: Sand sticking after shake-out.

SOLUTION: STEVENS #180-D Core Coating mixed to 45° Baumé.

RESULTS: All cored casting surfaces are smooth and 98-100% of core sand falls off at shake-out.

AUTOMOTIVE CYLINDER BLOCKS.

PROBLEM: Core coating spalling off in large sheets due to thermal shock in the oven. The exposed area caused metal penetration, increasing cleaning room costs.

SOLUTION: STEVENS Seal-Cote Core Coating.

RESULTS: Coating easily applied, good suspension at low Baumé. Core coverage was excellent. Using same core sand mix, coatings did not blister or spall off with increased oven temperature.

MORE SAVINGS STORIES PROOF THAT STEVENS CORE COATINGS...

ARE YOUR SHORT-CUT TO BETTER CASTING RESULTS

The above reports are typical of the results experienced by many foundries which are Stevens customers. Yes, when you have a facing problem your Stevens representative and Stevens technical and laboratory facilities are at your command. You can call for a technician to come in and analyze your present coating operation and work with you to find a faster, more efficient and economical way to coat your cores and molds.

And, in addition, when dealing with Stevens, you'll always be assured of controlled-quality facing products . . . just as outstandingly superior in the field as the Stevens reputation for service and integrity. Call in your Stevens representative now . . . or write today for Stevens Technical Bulletins F-106 and F-108 covering preparation and correct use of core and mold coatings in your foundry. FREDERIC B. STEVENS, INC., Detroit 16, Michigan.

BRANCHES: BUFFALO • CLEVELAND • INDIANAPOLIS
NEW HAVEN • DAYTON

IN CANADA: FREDERIC B. STEVENS OF CANADA, LTD.,
TORONTO • WINDSOR

FREDERIC B.
STEVENS
INCORPORATED
EVERYTHING FOR A FOUNDRY
DETROIT 16, MICHIGAN

Basic Layout is important!

BARTLETT-SNOW foundry layouts — conceived and developed by engineers with extensive training and specialized foundry experience — coordinate all departmental functions into a synchronized, efficient, low cost operation.

● Pioneers in applying mechanization to the foundry industry, Bartlett-Snow layouts are "tailor made" for your individual requirements, to obtain adequate working areas, free access to machines and materials and economical arrangement of equipment thus assuring maximum output per worker, per unit of floor area and per dollar invested. Many outstanding installations. Let us work out the solution to **your** problems.

DESIGNERS

ENGINEERS

BARTLETT-SNOW
CLEVELAND 5, OHIO

FABRICATORS

ERECTORS

Foundrymen Who Know — Buy Bartlett-Snow